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"BUSINESS as Usual?" Not a bit of it! This Year of Our Lord, now that "Gott" has abdicated, promises to be the biggest, best and happiest for generations. And the rubber trade? Just watch it grow.

THE YEAR IN REVIEW.

TO detail all of the notable and interesting happenings in the rubber trade for the last twelve months is a task that would seriously infringe the paper conservation rules. A bird's-eye view, however, shows the industry passing through lightning-like changes, from unpreparedness to readjustment, to contraction, to practical stoppage except for war work, and then to reconstruction.

Although in January a year ago, the industry was unprepared, individuals in the trade were already in the thick of the fight. Many adventurous and patriotic young men were in service as volunteer soldiers, aviators and ambulance drivers. Many "dollar a day" men were holding down important positions in Washington as organizers and experts. Industrial engineers, chemists and mechanics, were already leaving rubber and filling necessary places in war work plants. Then followed the volunteers and the drafted men, from office and factory

all over the country, by thousands and by ten thousands. No doubt the year will be known as a year of victory, but it is much else. It was a year of conservation, in rubber, coal, daylight, sulphur, gasoline, in almost everything except air and water. Manufacturers conserved labor and for the first time, woman became a great and helpful factor in rubber-manufacturing plants. Conservation in the line of investment was not, however, practiced. There were the four Liberty Loans, in each of which the trade went over the top, rubber men subscribing millions, promptly and generously. Then there were the gifts to the Red Cross, to the War Workers, to the French, Belgian, Armenian and other orphan funds, not to forget the investment in Thrift Stamps and War Saving Certificates.

With it all, through capable, hard working committees at home, rubber goods used in war work were standardized and turned out in quantities never before thought possible. New methods, new devices, and new compounds were created over night. With the scrapping of old methods, the dropping of "non-essentials" and the putting of big plants on a war basis, there was no disorganization. On the contrary the most wonderful organization that any industry has ever seen was created. To sum up—it was a good fight, cheerfully and efficiently fought, and 1918 is a year of which the trade may well be proud.

THE VICTORY BANQUET.

THE Annual Banquet of the Rubber Association of America to be held on the evening of January sixteenth, promises to be the most notable gathering that the trade has ever seen. Never before has it been so firmly knit in the bonds of successful effort, friendship and patriotism. Not again will there be available such an array of speakers afire with vital facts and thrilling anecdote. The times teem with problems of vast import. It is not idle prophecy to predict that in the speeches will be sounded the key-note of the great reconstruction that is already well begun.

AN ERA OF TRUSTS IN SIGHT.

THAT Germany to win back her place in the sun, even if it be under an umbrella of debt, will be and is already organized into a series of trusts, is to be expected. But that other European countries should be leaning somewhat the same way is surprising. Leaning is too mild, they are openly advocating amalgamations that will give quantity production, and that, assisted by government, will put them beyond the reach of ordinary competition. France and Italy are already planning extensive reconstruction in manufactures assisted by their respective governments. But it is in Great Britain that the promise of great trusts and amalgamations is noted. No less an authority than the Right Honorable Sir Albert Stanley, M. P., president of the British Board of Trade,

in a notable address before the Industrial Reconstruction Council, recently said:

It appears to me, therefore, that one of the first problems that we have to solve, and one to which the most earnest attention of manufacturers must be directed, is such an organization of industry as will make possible the complete overhauling of our industrial equipment, and establish large-scale production in all cases where it is economically advantageous, whilst in no way checking individual initiative and enterprise. How that result may best be attained, whether by the consolidation of companies or firms engaged in identical or allied branches of production, or by other forms of cooperation, is a matter primarily for those concerned in the industries themselves to determine; but I do say that considerable development of the kind is essential, especially in view of the competition of the great industries of other countries, particularly, the United States and Germany, which started from a much later stage in the world's industrial knowledge and experience, and have consequently been less influenced by tradition and less handicapped by works not up to modern standards.

That the British have ever been great and enterprising merchants none can deny. They have also been honest and above board in their merchandizing. If now they use in manufacture the conspicuous ability shown in quantity production of war material they will indeed be competitors hard to beat. Of course no great British rubber trust has yet appeared, but something of the sort is in the minds of those who plan to preserve the English industries.

A FRIENDLY MESSAGE FROM BRITAIN.

IN another column will be found a most timely and friendly letter from the Association of Rubber Manufacturers whose headquarters are in London. It is a vote of confidence in the integrity of the American rubber trade, and as such is a merited rebuke for those who for personal gain or perhaps from motives more sinister, strive to make trouble between the two great English-speaking countries. Such efforts if continued by the short-sighted, the selfish, and the prejudiced on either side of the water, will have little effect hereafter, at least in the rubber trade.

RUBBER RESTITUTION.

THE rubber trade of Germany may or may not have been in sympathy with the aims of the Prussian War Lords. From no individual in it, however, has come the slightest protest or hint of disagreement with the policy of destruction and frightfulness visited upon the French, Belgians, and Russians. Not only that, but according to reports, the rubber mills in occupied territories were dismantled and the stocks and machinery sent to Germany. In any equitable peace adjustment, the mills should be rebuilt, new machinery installed, and stocks replenished, if not by the German Government, then by the German rubber manufacturers. We could wish for the good of their souls that they do this voluntarily,

but that is perhaps too much to hope for. At all events, willingly or unwillingly, it should be done.

ALLOCATING GERMAN CRUDE RUBBER.

THAT Germany may pay her gigantic debts she must run her factories to the limit. To do this, certain raw materials controlled by the Allies are necessary. Of these is rubber. To be sure there are two opinions regarding the scarcity of rubber in Germany. One belief is that nothing but a poor grade of reclaim is to be found in all Teutonia. The other claims that by the development of synthetic rubber, and by the extraction of rubber from certain weeds and shrubs indigenous to Germany and Austria-Hungary, no great scarcity exists. Be that as it may, the cards will soon be on the table and these obscure points cleared up.

Before the war the Central Powers used some 20,000 tons of crude rubber, and a greater number of tons of reclaimed rubber. Supposing the needs for home consumption and such export trade as is still pro-German remain about as above, will Germany be allowed to go into the open market and purchase as much as she needs, and will ships be furnished to transport it? Or is it to be passed through Allied hands and allocated? This is a somewhat interesting question to planters, producers, and more remotely, to rubber manufacturers.

THOSE WHO APPRECIATE THE TEUTONIC LACK OF inventiveness are skeptical regarding the peace value of the floods of substitutes that war has forced them to develop and use. As far as the rubber industry is concerned the interest centers about synthetic rubber and cotton substitutes. With regard to the first there is no probability that it will have commercial value in times of peace, while the second may or may not be worth consideration. That the Allies refuse to grant protection to these or other war products would be only fair to a world impoverished by German greed. That is, unless a recreated Germany extends protection to Allied inventions.

JOINT ACTION ON THE PART OF THE USERS OF RAW materials is earnestly advocated by European publicists. If this crystallized into action it would mean cooperative buying of crude rubber either through government or a purchasing syndicate. If England, France, and the rest of the big European countries thus assured themselves of their crude rubber supply, would manufacturers in the United States buy as individuals what is left, or would they also buy, perhaps through The Rubber Association of America?

THERE ARE 2,000,000 ACRES OF PRODUCING CULTIVATED rubber trees in the world. Of these 1,600,000 acres are under British control. The market value of the shares representing this immense acreage was in August last, according to the London "Times," \$750,000,000.

Echoes of the Great War.

Function of the War Trade Board. Revised Procedure for Licensing Exports to or Through Allied Countries. The War Trade Board of the United States Russian Bureau, Inc. New Export Conservation List. Individuals Named as Enemies in President's Proclamation. More Athletic Goods for Men in Service. Jeannette War Service Activities to Continue. Service Notes and Personals.

FUNCTION OF THE WAR TRADE BOARD.

SPEAKING of the functions of the War Trade Board for the present and immediate future, Vance C. McCormick, chairman, said recently:

The War Trade Board has a function to perform until the peace treaty is signed. Under the terms of the armistice the blockade of the enemy countries is maintained, and the control over exports and imports is to be exercised.

Sufficient tonnage must be conserved by this control to supply the needs of our two million troops overseas, to guarantee them all possible protection and bring them safely home. There must be protection assured our Allies and the distressed and needy nations of Europe in the matter of supplies. When this work has been done, international trade can be quickly restored. Pending that time I have every confidence that the patriotism and justice of the American people will have them exercise patience until these vitally important plans are worked out and normal trade is resumed.

In the meantime the War Trade Board, in cooperation with the Allies, is relaxing just as far as possible every restriction which does not conflict with the above policy.

REVISED PROCEDURE FOR LICENSING EXPORTS TO OR THROUGH ALLIED COUNTRIES.

The War Trade Board announces the adoption of a simplified procedure effective for the issuance of export licenses for shipments which are:

(A) Destined to the United Kingdom, France, Italy, or Belgium (excluding their colonies, possessions, and protectorates), either directly or by way of any other country or colony; or

(B) Destined to any country or colony by way of the United Kingdom, France, Italy, or Belgium, excepting shipments destined to Switzerland by way of Italy.

The changes in the procedure are:

That holders of orders for export to the destinations and in the manner mentioned above in paragraphs (A) and (B) will be permitted to purchase or otherwise acquire or commence to manufacture or produce or fit the articles specified in the application for the fulfilment of a specific export order prior to the issuance of an export license.

That applications for licenses to export to the destinations and in the manner mentioned above in (A) and (B) will no longer be referred by the War Trade Board to the War Industries Board.

(1) Applications for licenses to export any commodities to the destinations and in the manner mentioned above in (A) and (B) must include one of each of the following papers properly executed:

(a) Application Form X, to which should be attached

(b) Such Supplemental Information Sheets as may be required by the rules and regulations of the War Trade Board to be used in connection with shipments of certain commodities or shipments to certain countries (such as Form X-1, X-2, etc.).

(c) A new Supplemental Information Sheet, Form X-122, in place of Form X-115.

(2) In Form X-122 the applicant is required to show that permission to import or purchase (if such permission is required) has been duly granted by the government of the allied country to or through which the shipment is to be made.

(3) Applications filed with Form X-122 attached should be mailed directly to the War Trade Board, Washington, D. C.

They will then be referred by the War Trade Board to the War Mission of the allied country to or through which shipment is to be made.

(4) This simplified procedure will relieve applicants for export licenses from giving certain information and making certain agreements as formerly prescribed on Form X-115.

THE WAR TRADE BOARD OF THE UNITED STATES RUSSIAN BUREAU, INC.

This company has been organized by the War Trade Board at the direction of the President of the United States to aid in supplying the needs of the people of Russia, in encouraging Russian production and trade, and assisting in the marketing of Russian products in America and their exchange for American goods, for the purpose of helping the Russians to help themselves in stabilizing the economic situation in Russia. It has a capital stock of \$5,000,000, all of which has been issued and fully paid in cash out of government funds. The stock is owned in its entirety by the United States Government.

The company will engage in the business of exporting to Russia and Siberia agricultural implements, shoes, clothing, and other commodities which the Russian population need, and of importing Russian and Siberian raw materials in return. One of the chief objects will be the encouragement of private capital to engage in trade in Russia and Siberia as shipping becomes available for the purpose. The policy will be to cooperate with, encourage and promote such trade with Russia as will assist in the rehabilitation of her economic life, and to cover by direct operations only such portions of the field as cannot at present be served readily by private enterprise.

The head office of the Russian Bureau is in the War Trade Board Building at Washington, D. C. The board of directors of the company consists of the members of the War Trade Board. Hon. Vance C. McCormick, chairman of the War Trade Board, is president of the company; John Foster Dulles is secretary and treasurer, and Henry B. Van Sinderen is acting manager. The directors are Vance C. McCormick, Thomas L. Chadbourne, Jr., Edwin F. Gay, Albert Strauss, Alonzo E. Taylor, J. Beaver White, and Clarence M. Woolley.

NEW EXPORT CONSERVATION LIST.

The new list effective December 20, 1918, superseding all previous lists, includes the following items of rubber interest. Shippers are reminded that individual licenses are required for shipment of all commodities covered by the export conservation list to all countries, including Canada and Newfoundland:

Crude rubber, guayule, balata, gutta percha, gutta siak, jelutong, reclaimed rubber, scrap rubber, burlap, aniline oil, corn oil, gasoline, naphtha.

INDIVIDUALS NAMED AS ENEMIES IN PRESIDENT'S PROCLAMATION.

The President of the United States has designated the following persons as included within the term "enemy," under the Trading-with-the-Enemy Act: Charles Duisberg, Christian Hess, and Rudolph Mann, of Leverkusen, Germany; A. W. Faber, Stein, Germany; H. Otto Traun, Hamburg, Germany; Paul Mecke, Heppel Leop, Estate of Von der Heide, and Bitumen Wunnersche, all of Unna, Germany; H. Rost & Co., Dr. F. Lampert, Mrs. Anna L. Lampert, Mrs. Caroline Soltan, and Mrs. Olga J. C. Schruppf, all of Hamburg, Germany; and Robert Bosch and associates, of Stuttgart, Germany.

MORE ATHLETIC GOODS FOR MEN IN SERVICE.

During the past year contracts for athletic equipment amounting to \$795,000 have been awarded by the War Department Commission on Training Camp Activities. The last contract, awarded in November, called for the following items of interest to the rubber trade: 5,400 medicine balls, 6,000 Rugby footballs, 12,000 soccer footballs, 3,000 Rugby bladders, 6,000 soccer bladders, 18,000 playground balls and 3,000 basket-balls.

There is still about half a million dollars available for further expenditures and the Commission is inclined to enlarge the shipments of their supplies rather than otherwise. It is realized that the armistice increases the need for athletic supplies, as the let-down will be severe unless particular effort is made to maintain the morale of the men.

JEANNETTE WAR SERVICE ACTIVITIES TO CONTINUE.

Jeannette, Pennsylvania, does not intend to neglect the future welfare of returning soldiers and their dependents now that the war is over. The Jeannette War Service Union prides itself on having, in a little city of only 12,000 inhabitants, over 4,200 monthly contributors and no delinquents. The president, Seneca G. Lewis, general manager of the Pennsylvania Rubber Co., states that although the Union has a fund exceeding \$15,000 in the treasury, after meeting all possible contingencies in connection with war work, it is intended to continue indefinitely in order to safeguard absolutely all returning men who may need assistance.

SERVICE NOTES AND PERSONALS.

While the majority of the sons of the rubber men will soon return home and resume their pre-war occupations, others will continue to wear khaki. Of the last-named type is Lieutenant-Colonel Fred Garcin, now stationed at San Francisco, but likely at any moment to be sent overseas, perhaps to Siberia, or to any of the scores of places in Central Europe where Uncle Sam's Regulars are in more or less temporary control. For Colonel Garcin is of the Regular Army, having chosen this profession some four years before the war began. Furthermore, he joined the Artillery, which branch of the service has shown such notable advancement in the past four years, and has called for the severest sort of scientific attainment. The fact that Mr. Garcin was advanced from the grade of second lieutenant to that of lieutenant-colonel testifies to his ability as an officer. Incidentally, he is the youngest officer of his rank in the service. It is interesting to note that he is the only son of Edward H. Garcin, long known as a prominent manufacturer of mechanical rubber goods and asbestos and rubber specialties.



LIEUTENANT-COLONEL
F. R. GARCIN.

Looking Backward—and Forward.

What Men Prominent in the Trade Say of the Year's Happenings.

FROM IMPORTANT MEMBERS OF THE WAR SERVICE COMMITTEE.

THE consensus of opinion appears to be that with the complete withdrawal of government control and supervision the rubber industry is about to enter a period of great expansion and prosperity in which wartime conservation and standardization will prove a beneficial influence; that the necessary readjustments will be effected with comparative ease, and that the inevitable cancellations of government contracts will work no great hardships because of the volume of long-standing orders for normal business in most lines of rubber goods.

BOOT AND SHOE DIVISION.

GEORGE H. MAYO, CHAIRMAN.

"The footwear division of the War Service Committee of the Rubber Industry worked in the closest harmony throughout the war, and one and all contributed patriotically to the service of the Government. There seems to be much that could properly be done under peace conditions for the welfare of the industry and I am in hopes it will seem wise to the committee to continue some of the constructive work that has been undertaken by them."

CLOTHING DIVISION.

N. LINCOLN GREENE, CHAIRMAN.

"During the period of the war we have given to the Government our capacity, and more, and with the abrupt cancellation of government contracts, will naturally find it somewhat difficult to readjust production to a normal basis, although we fully expect to get from under such a condition at an early date.

"In our opinion, the cessation of the war will not be the cause of great reduction in prices, for such goods as we will market for the coming season are based on what we would term the peak of prices in labor, materials, and findings.

"The experience and advantage that has been gained through a classification of various types of business into committees under the supervision of the War Industries Board will be of great benefit in shaping policies for the future, having always

in mind the thought of conservation; it having been clearly shown that many articles and many of the minor details that have been treated as essential in the past might be easily dispensed with.

"It is our opinion that there will be some months of depression, to be followed by the largest and most active business ever known to our industry."

CRUDE RUBBER AND KINDRED PRODUCTS DIVISION.

CHARLES T. WILSON, CHAIRMAN.

"The War Trade Board will continue to exercise their control over crude rubber until actual peace is declared. Therefore, the duties of the division in carrying out their instructions in respect to their various regulations will be likely to go on until this time."

FOREIGN TRADE DIVISION.

E. H. HUXLEY, CHAIRMAN.

"With the close of the war we find ourselves free to develop our export trade without the ball and chain of government control being dragged after us. This is a great relief, but we still have serious problems to solve.

"Shall we be able to hold the trade that has come to us with so little foreign competition, and shall we be able to increase it? We are now confronted with a period when competition will be free and open to all, and when it will not be confined to our fellow-American manufacturers, but to the tried and experienced exporting manufacturers of Europe. With anything like equal conditions we shall be successful competitors. To make the conditions equal, however, we must have reasonably equal labor conditions and rates of pay; reasonably equal facilities for shipping and reasonably equal rates; and, also, access to and prices for raw materials on a par with our foreign competitor. Optimists believe that we shall have these equalities, and it is not difficult to be an optimist. There is much to be accomplished to bring about the result, but there appears to be no reason to doubt that it will come. We cannot, of course, overlook that most important feature, namely, manufacturing methods, but no one

doubts the ability of the United States to compete on this score, for the ingenuity, resourcefulness and initiative of the American manufacturer are proverbial.

"The closing of the war cannot help being beneficial, and with the many advantages of the position in which the United States finds itself, optimism would appear to be thoroughly justified in contemplating the future."

GAS DEFENSE DIVISION.

DR. W. C. GEER, CHAIRMAN.

"The Gas Defense Division of the War Service Committee of the Rubber Industry has spent considerable time during the past year in assisting the Gas Defense Service of the War Department in writing their specifications for the various rubber parts of gas-masks. We have cooperated with them in the development of design, compounding, and manufacturing methods, and a large amount of work has been done.

"Since the gas-mask is purely a war munition, the ending of the war means the closing of the work and, therefore, as soon as the orders from the Gas Defense Service ceased, due to the signing of the armistice, the work of the Gas Defense Division of the War Service Committee also ceased. There is nothing more for us to do."

HARD RUBBER DIVISION.

H. WEIDA, CHAIRMAN.

"For the past eighteen months practically all the hard-rubber manufacturers were making hard-rubber parts for war essentials, requiring from 60 to 95 per cent of their total output, and due to the governmental needs it was necessary to refuse to take orders for the regular commercial lines which were enjoyed before the war.

"Now that the war is over, every effort is being made to put the industry back on a peace basis, with the idea of again serving our customers with the same dispatch as before the war.

"The future of the hard-rubber industry is very promising, and with the increased manufacturing facilities of the United States, brought on by the war, and the constant new uses to which hard rubber can be profitably put, together with the possibility of supplying the European countries with the same line furnished them by Germany before the war, I am sure that the very best years in the history of the industry are before us."

INSULATED WIRE AND CABLE DIVISION.

WALLACE S. CLARK, CHAIRMAN.

"The cessation of active hostilities has meant the suspension of manufacture and the probable ultimate cancellation of orders for some \$30,000,000 worth of insulated wire and cable.

"The first effect of this will be to allow many long-standing orders for the smaller sizes of commercial rubber-insulated conductors to be manufactured and shipped by manufacturers. Secondly, it should allow the replacement of depleted stocks throughout the country.

"It is felt by the division that this activity will largely carry the manufacturers over the pause before the return of normal business. In so far as the division has gone into this matter, the attitude of the various government departments concerned in the termination of existing contracts has been fair and reasonable."

MECHANICAL GOODS.

E. S. WILLIAMS, CHAIRMAN.

"The ending of the war finds the Mechanical Goods Division of the War Service Committee in the position of not having received official notification of the approval of the various recommendations this committee made with regard to conservation and standardization of mechanical goods. The committee submitted a questionnaire to all mechanical-goods manufacturers and after due consideration, somewhat prolonged by the complexity of the subject, a number of recommendations were made to the Conservation Division of the War Industries Board last summer. These recommendations cover a maximum number of goods, allowable for belting, steam hose, water hose, and many other lines.

"The mechanical-rubber business has been built up on a multiplicity of styles and grades of goods, each produced to meet particular conditions of competition and use. It is felt that while there are great difficulties in the way of a standard maximum number of grades, still, a great deal of good would be accomplished by the adoption of some such standards. The Conservation Division appeared to favor the recommendations made, but for one reason and another official sanction and promulgation was delayed and the signing of the armistice found the matter still pending.

"It is now hoped that the benefit of the work already done will not be lost, and that the regular organization of the Rubber Association will take up the matter and make such modifications as seem advisable under peace conditions and try to bring about an agreement on the subject which will be beneficial to all."

MEDICAL RUBBER GOODS AND SUNDRIES DIVISION.

A. W. WARREN, CHAIRMAN.

"The ending of the war necessarily caused the cancellation of many large contracts from the medical department of the United States Army, and while these contracts are now pending adjustment, it is not thought among the trade that the sudden discontinuation of the placing of large orders will in any way affect this particular branch of the rubber industry.

"As a matter of fact, most of the contracts had been placed with specifications for delivery not later than December 31, and while the contracts were unusually large for this particular class of merchandise, it did not to any great extent interfere with the commercial business, on account of the preferential rating given the medical rubber goods industry."

PNEUMATIC TIRE DIVISION.

G. M. STADELMAN, CHAIRMAN.

"The ending of the war means the termination of the activities of the Pneumatic Tire Division of the War Service Committee at the same time the War Industries Board ceases to function.

"Were it not for the fact that the Pneumatic Tire Division expects to ally itself with the Rubber Association of America as a division of that association, all of the good work which has been done with respect to conservation and standardization would be lost. It is my belief, however, that this work will be carried on by this new body."

RAILWAY SUPPLIES DIVISION.

H. E. RAYMOND, CHAIRMAN.

"It is understood that the life of the War Service Committee of the Rubber Industry will terminate January 16, 1919, coincident with the annual meeting of The Rubber Association of America. Automatically its sub-committees will cease to be. The Rubber Association will continue to serve the Government where needed to wind up matters pending, inclusive of railroad needs.

"My division of activity will have accomplished several important acts of standardization, continuing for all time to come, which the war's ending will not destroy."

RECLAIMED-RUBBER DIVISION.

F. H. APPLETON, CHAIRMAN.

"In my opinion, now that the rubber manufacturers are no longer making war goods, and therefore, are enabled to resume their regular lines, it would seem that the demand for reclaimed rubber should return to normal."

SOLID TIRE DIVISION.

J. W. THOMAS, CHAIRMAN.

"It is to be hoped that our industry will recognize that, notwithstanding the termination of the war, there is still a great patriotic work to be done by many of the committees which have been appointed. Generally speaking, the standardization work of any industry tends to improve the general economic conditions of the country. The prevention of waste and the concentration of effort along certain well-defined lines is as much a patriotic duty in times of peace as in war.

"Our industry as a whole will be immensely benefited by the standardizations which have been formulated by the Solid Tire Division, and the truck owner will be equally benefited if the truck builder recognizes the value of this work and accepts the standardizations in the same spirit that prompted their creation. The work in the immediate future by the Solid Tire Division is to promote the general adoption in commercial lines of the standardizations which the division has created. The honest effort and whole-hearted enthusiasm which has been shown in the work of the Solid Tire Division is very gratifying, and is indicative of what our industry can really accomplish by the continuation of such committee work in time of peace."

THE RUBBER ASSOCIATION AND THE WAR SERVICE COMMITTEE.

"More remarkable has been the manner in which the rubber industry, through its representatives, has enforced the restrictions and managed the details of import and export licensing, curtailment, and allocation, affecting it under the direction of the War Trade Board. For untiring and impartial service, sound judgment and keen foresight, the officials of The Rubber Association of America and the members of the War Service Committee of the Rubber Industry, including its numerous divisions, deserve the grateful appreciation of the whole trade."

"Following the industrial mobilization of the country in December, 1917, and the organization of the War Service Committee to assist the Government, events of great moment to the rubber industry crowded one upon another in rapid sequence. To prevent crude rubber and rubber goods from reaching the enemy, all imports of crude rubber and allied gums, cotton and other materials were put under license. The Rubber Association was asked by the War Trade Board to act as consignee of all importations of crude rubber from foreign countries, to be released only under guarantees of good faith. For the same reasons, to prevent shortage and to conserve them for ourselves and our allies, rubber and allied gums, also numerous chemicals and compounding ingredients, were placed on the Export Embargo List. That the enemy might not profit from American business, the Enemy Trading List was issued, prohibiting trade with certain Latin-American firms. In February, these precautions were followed by placing all imports and exports under license."

"By May the demands upon the available ship tonnage had become so great that drastic restrictions in overseas commerce became necessary and the importation of crude rubber, along with other commodities, was curtailed. To prevent speculation, maximum prices for the various grades were fixed in advance. The basis of importation for a three months' period was set at 100,000 tons per annum; government needs, estimated at 35,000 tons, were deducted and the balance allocated pro rata to each firm on a basis of 7/16 of its 1917 consumption. This arrangement and subsequent modifications were worked out with the aid of data furnished by a series of questionnaires issued to the trade by the War Service Committee, in which, for the first time in history, rubber manufacturers told how much crude and reclaimed rubber they consumed."

ENTHUSIASTIC SERVICE.

"Hampered by coal and labor shortages, enforced holidays, transportation difficulties, adverse priorities, embargo, restriction, curtailment, and allocation of raw materials and finished products, high taxes and constantly advancing costs for wages and most commodities, rubber men have persisted in patriotic optimism and practical helpfulness rather than self-pity. Their zeal to further American participation in the war is imperishably written in the records of every campaign for Liberty Bonds, War Savings Stamps, United War Work and Red Cross funds; it is seen in the innumerable firm and community funds to provide wholesome entertainment, reading matter, athletic goods, comfort kits and smokes for the boys in service; it is mani-

festated by the enthusiasm for Americanization in rubber mills, that foreign-born employees may be educated in our language and ideals. Service flags in virtually every establishment bear eloquent testimony to the thousands of officials and employees in various branches of war service, many being in executive government positions of great responsibility."

PRACTICAL PATRIOTISM.

"This world conflict has placed rubber goods among the prime essentials of modern warfare, and the industry may take a just pride in the notably high average quality of the goods supplied and the marked absence of anything savoring of profiteering. Even the unfortunate raincoat scandal is being shown in the courts to be the fault of irresponsible workers and careless inspectors rather than that of the rubber industry. The dispatch with which enormous quantities of waterproof garments, gas-masks, and other rubber goods were supplied to the Army and Navy was truly wonderful, while the eagerness with which the entire heavy-footwear producing capacity of the country was placed at the disposal of the Government until military needs for millions of pairs of rubber boots, overshoes and gaiters were met, regardless of more lucrative civilian orders, exemplifies the sort of practical patriotism that has animated the trade."

CYCLE AND MOTOR TRUCK TIRES.

"The past year has witnessed numerous economic changes brought about by the war, which affect the rubber industry greatly. Higher transportation costs have increased the use of the bicycle, with a consequent greater demand for tires. But of far more importance is the enormous development of motor trucks for army use, delivery purposes, short-haul and even long-distance overland freights in which a few rubber companies were among the pioneers. More than half a million motor trucks are now in use in the United States, and it is confidently predicted that in five years there will be four millions. A phenomenal growth of the solid-tire industry has resulted. Meanwhile, too, cord construction has removed the previous limits of pneumatic-tire sizes, and 12-inch cord tires are now being successfully used on the heaviest trucks, prolonging their life and increasing their speed. Nothing can stop this great economic movement except the failure to build hard-surfaced roads of adequate strength to carry the greater tonnage at the higher speed required, and with government officials everywhere awake to the need, an adequate construction program seems assured."

"New industries have been created and further incentive given to the old by the abnormal conditions affecting raw materials. The prevailing spirit of economy, the necessity to conserve rubber, the high cost and shortage of tires, and the importance of obtaining maximum service from them have all been factors in the new industry of retreading or rebuilding tires, which has assumed considerable importance in America during the last twelvemonth. Henceforth thousands of automobile tires, such as were formerly discarded prematurely, will be rehabilitated for further service at a lower cost per mile than that of new tires."

THE SPIRIT OF COOPERATION.

"Certainly the magnificent spirit of patriotism and cooperation in which the trade as a whole has faced the problems and hardships of the war, always making its decisions for the good of the entire industry, indicates with what confidence the period of readjustment and reconstruction may be looked forward to. In this connection legalized export combinations in America will go a long way to offset the scheme of a possible Prussian rubber trust to secure an inordinate share of foreign trade."

RUBBER PRODUCTION IN THE FAR EAST.

Messrs. Harrisons and Crosfield, Limited, London, England, calculate that the annual production of plantation rubber in the Far East will amount to 350,000 tons when the 2,000,000 acres of trees have all attained 400 pounds per acre.

Activities of the Rubber Association of America, Inc.

DECEMBER has been an eventful month for the rubber industry in the removal of manufactured rubber products from the export conservation list, the withdrawal of all restrictions governing the production of rubber products, and the removal of all restrictions relating to the imports of crude rubber. Imports will continue to be consigned to The Rubber Association and the usual guarantees required. Members of the Association were promptly informed of these and other events of interest to the trade by the following communications from The Rubber Association and the War Service Committee:

MANUFACTURED PRODUCTS FREE OF EXPORT.

December 2, 1918.

To all rubber manufacturers:

We quote herein a letter received from the Bureau of Imports of the War Trade Board, under date of November 27, 1918:

For your information we advise you that manufactured rubber products have been removed from the Export Conservation List, effective November 27, 1918. This means that after that date it will not be necessary for exporters to obtain their licenses for export shipments of manufactured rubber products from the Bureau of Exports in Washington, as heretofore. The branch offices of that Bureau will issue the licenses in the future.

TRAFFIC COMMITTEE'S VIEW OF TRANSPORTATION PROBLEM.

December 4, 1918.

To firm members of The Rubber Association of America:

The Traffic Committee wishes to bring to the attention of the members of this association what is believed by many to be the most important transportation problem ever presented to the American people, namely, the future operation of our transportation facilities through the medium of government ownership or the restoration of the properties to their owners with continued private control under reasonable governmental regulation.

The committee believes that the cessation of the war has brought about a very great change in the transportation needs of the country and that the best interests of the shipping public can be met only by private control and operation subject to reasonable regulation by our Government, such regulation to permit efficient competition. The committee realizes that undoubtedly many methods formerly in vogue in connection with the operation of our transportation system should not be used again and that any of the benefits to the public that have been made possible by unified control should be retained.

Please understand that the Traffic Committee has reached this conclusion only after careful thought and investigation and the committee's consideration was not subject to any influence other than the desire to protect the transportation interests of the industry.

At the annual meeting of the Traffic Club of New York, held on Tuesday, the 26th ultimo, those present were particularly fortunate to have the privilege of listening to a clear presentation of the transportation problems by Lewis J. Spence, Director of Traffic, Southern Pacific Co. Mr. Spence's views of the situation are so clear and fundamentally sound that this committee believes that every one interested in transportation matters should read his address.

We appreciate fully that with respect to a problem of this kind the members may have reached a conclusion based on their experience with transportation conditions, but we respectfully suggest that if the individual members can share the view of this committee, the able presentation of the matter by Mr. Spence should be placed in the hands of the congressmen and senators of your congressional districts and states, accompanied by an appeal for their support in reasonable and sane regulation of transportation facilities, to the end that they may be returned to their owners for operation with reasonable businesslike regulation by our Government.

PACIFIC COAST EXPORT BILLS OF LADING.

December 10, 1918.

To firm members of The Rubber Association of America:

Your attention is directed by the Traffic Committee to the following notice issued by Regional Directors A. H. Smith and C. H. Markham of the Eastern and Allegheny Regions, respectively,

relating to the issuance of export bills of lading via Pacific Coast ports:

To All Concerned:

For the purpose of issuing export bills of lading via Pacific Coast ports, the Trans-Pacific Export Bill of Lading Agency is hereby established as of December 15, 1918, located at 143 Liberty street, New York City, with C. H. Morehouse, Agent, in charge.

To minimize the work and facilitate the issuance of export bills of lading, the following rules are prescribed:

The exporter or shipper will be required to make all necessary copies of bills of lading, showing thereon the export license number and date of expiration; the railroad permit number, weight, measurement, rate, inland, ocean and State toll charges.

All bookings with steamship lines must be made by the shipper or exporter through their own agencies.

Railroad permits are required in all cases and may be obtained by the exporter or shipper through their Pacific Coast representative or by agent with whom the booking was made. Such permits are issued by the North Pacific Export Committee at Seattle, Washington, and the California Export Committee at San Francisco, California.

Advices of clearances at ports of exit, when required, must be obtained by exporters or shippers through the agency with whom booking was made.

The payment of all bills covering inland, ocean and State toll charges must be made within the provisions of Director General's Orders Nos. 25 and 25-A.

NOMINATING COMMITTEE'S REPORT.

December 12, 1918.

To the firm members of The Rubber Association of America:

Pursuant to article VI, section 2, paragraph (a) of the constitution and by-laws of The Rubber Association of America, Inc., the undersigned Committee on Nominations submit the following list of nominations for four directors to succeed those whose terms expire in January, 1919:

James Newton Gunn, United States Tire Co.; John S. Lowman, Philadelphia Rubber Works Co.; A. D. Thornton, Canadian Consolidated Rubber Co., Ltd.; Seneca G. Lewis, Pennsylvania Rubber Co.

These nominations are to be voted upon at the annual meeting to be held at the Waldorf-Astoria, New York, on January 16, 1919.

In accordance with the amendment to the constitution and by-laws adopted at the annual meeting of the Association in January, 1918, all directors of The Rubber Associations are now elected for terms of three years.

CALL FOR ANNUAL MEETING.

December 16, 1918.

To the firm members of The Rubber Association of America:

You are hereby notified that the annual meeting of The Rubber Association of America, Inc., will be held at the Waldorf-Astoria, New York, on Thursday, January 16, 1919, at 4 o'clock p. m., at which meeting four directors to serve three years, to succeed those whose terms expire at that time, will be elected, and the reports of the officers submitted.

The Board of Directors recommends that the constitution and by-laws of the Association be amended so that elections to membership in the Association may be by vote of the Board of Directors, as well as by the Executive Committee; also that Article XII of the constitution and by-laws entitled "Entertainments" be amended so that entertainments and dinners of the Association may be held at the discretion of the Board of Directors or the Executive Committee, instead of at the discretion of the Executive Committee alone, as it reads at present; also that Article XIV entitled "Expulsions or Suspensions" be amended so that the Board of Directors will have equal authority with the Executive Committee in such cases.

Every firm member of the Association is entitled to be represented at the annual meeting by the registered firm representative, but the firm representative's voting power may be delegated to some one in the employ of or acting for such member by giving a written proxy. Each firm member is entitled to one vote. Should your firm representative be unable to attend the annual meeting, he may execute the enclosed blank proxy and direct the person in whose favor he executes such proxy to present the same at the entrance to the meeting.

The annual meeting will be followed by the nineteenth annual banquet, which this year takes the form of a Victory Banquet, in the grand ball-room of the Waldorf-Astoria, at 7.30 o'clock in the evening.

FIRM AND ASSOCIATE MEMBERS ELECTED.

The Executive Committee elected the following firm and associate members at the meeting of December 19:

FIRM MEMBERS AND REPRESENTATIVES.

Arnold W. Francis, Arnold W. Francis, 66 New street, New York City.

The Rossendale-Reddaway Belting & Hose Co., Henry P. Wherry, 32 Euclid avenue, Newark, New Jersey.

Alfred Hale Rubber Co., David A. Cutler, Atlantic, Massachusetts.

ASSOCIATE MEMBER.

W. H. Parker, National Standard Co., Niles, Michigan.

VICTORY BANQUET.

The nineteenth annual banquet of The Rubber Association of America, Inc., will take the form of a Victory Banquet and will be held in the grand ballroom of the Waldorf-Astoria, 5th avenue and 34th street, New York, on Thursday evening, January 16, 1919, at seven-thirty o'clock. Tickets will be twelve dollars.

Arrangements have been made for seating guests at round tables accommodating parties of eight or ten persons. Members desiring entire tables, or those who wish to sit together but do not require an entire table, will kindly state their wishes when ordering tickets, using the form provided. Tickets are sold only to members or to those in their employ, but there is no limitation to the number which each member may purchase.

WAR SERVICE COMMITTEE OF THE RUBBER INDUSTRY.

RUBBER RESTRICTIONS REMOVED.

THE following telegram and detailed information was sent to the rubber trade on December 13, 1918, as a result of the meeting of the chairmen of the various war service committees held on the same date:

We are pleased to advise that all restrictions governing production of rubber products and the amount of crude rubber that may be imported from primary markets have been withdrawn effective to-day. Rubber will be consigned to the Rubber Association as heretofore and the usual guarantee will be required, but maximum prices on allocation features are entirely eliminated.

WAR SERVICE COMMITTEE OF THE RUBBER INDUSTRY.

DETAILS OF THE RULINGS.

To the rubber industry:

Confirming our telegram of this date, we quote below letter received from the War Industries Board:

United States War Industries Board,
Washington, D. C.

December 12, 1918.

War Service Committee of the Rubber Industry, U. S. A.:

Beg to advise that effective December 13, 1918 all restrictions governing the production of all rubber articles, including casings and tubes under six inches, are herewith withdrawn. This ruling annuls Issue No. 2, Regulations Governing the Production of Rubber Products and revised schedules on casings and tubes authorized November 16, 1918, by the rubber section for the October-December period. Kindly wire all manufacturers accordingly.

H. T. DUNN, Chief.

Rubber Section, War Industries Board.

From the above, you will note that all restrictions as to production of manufactured rubber goods have been removed, effective immediately.

We also received the following instructions from the War Trade Board contained in letter and telegram of this date:

By a regulation passed this day by the War Trade Board the restriction as to quantity of crude rubber which may be licensed for shipment from overseas has been revoked, effective immediately. On and after this date, licenses to import crude rubber from overseas will be issued without limit as to quantity, provided applicant conforms with all existing regulations of the War Trade Board. The War Trade Board also withdraws the maximum prices and the allocation features. Rubber will continue to be consigned to The Rubber Association

as heretofore and the Association will continue to require the usual guarantees.

Your attention is directed to the fact that the relaxation of this restriction only affects shipments from overseas. We are informed it will not be the general policy of the War Trade Board to issue licenses for the importation of rubber from countries other than those of origin until after February 13, 1919, and that this same policy will apply to shipments now in the United States which have arrived in violation of the regulations.

WAR SERVICE COMMITTEE.

RUBBER GOODS IMPORTS PERMITTED.

DECEMBER 20, 1918.

To manufacturers and importers of rubber manufactured goods:

We quote below letter received from the War Trade Board notifying us of the revocation of the regulation prohibiting the importation of manufactured rubber goods:

For your information we would advise you that the War Trade Board ruling prohibiting the importation of rubber manufactured goods has been revoked by War Trade Board ruling No. 427 and the Bureau of Imports has been instructed to issue licenses permitting the importation of rubber manufactured goods provided applications conform to other regulations of the War Trade Board.

STANDARDIZATION AND CONSERVATION SHOULD CONTINUE.

While all conservation rulings have been revoked, the War Industries Board expresses the hope in the following letter from the Conservation Division, that the rubber industry will continue to eliminate needless waste:

Owing to the changed conditions in the rubber industry the Conservation Division has decided, with the concurrence of the Rubber Section, that the various conservation schedules that have been issued to rubber manufacturers will be rescinded. Will you please notify the members of the industry of this decision?

The information that we have received in the course of our inquiries regarding these schedules indicates clearly that substantial savings of labor, material, equipment and capital are resulting. We heartily appreciate the ready spirit of cooperation that has been shown by the rubber industry and we hope that the industry of its own accord will find it possible to continue to observe those provisions of the schedules which eliminate needless waste and can be carried out without real hardship.

NEW DIVISIONS TO BE ORGANIZED.

In view of the above communication the War Service Committee has suggested that the chairmen of those divisions not already divisions of The Rubber Association extend an invitation to the manufacturers to attend a luncheon-meeting at the Waldorf-Astoria January 16 and organize similar divisions of the Rubber Association.

REDUCTION IN ZINC OXIDE PRICES.

The New Jersey Zinc Co., New York City, announced December 14, 1918, a reduction in prices on its brands of zinc oxide and lithopone used by the rubber trade. The new price list, which became effective immediately, and which applies on contracts for the first quarter of 1919, follows:

AMERICAN PROCESS.		
	Carloads.	Less Carloads.
Special	10 1/2	10 3/4
XX	10	10 1/4
FRENCH PROCESS "FLORENCE BRANDS."		
	Carloads.	Less Carloads.
White Seal	13	13 1/4
Green Seal	12 1/2	12 3/4
Red Seal	12	12 1/4
Lithopone	7 3/4	8

Above prices apply only when packed in barrels. When packed in bags the price is one-eighth of a cent per pound less.

ABOLITION OF EXPORT DUTY ON RUBBER AT IQUITOS.

The duty of \$0.44 per 100 pounds on rubber exported from Iquitos, Peru, has been repealed. Rubber exports from other Peruvian points is still subject to the regular export duty of 8 per cent. ad valorem, except rubber from Putumayo, which pays only half that amount.

Government Specifications for Tires, Tubes, Repair Materials and Accessories.

THE Motor Transport Corps of the United States Army, the War Service Committee of the Rubber Industry, and the Special Board of Officers, convened under paragraph 30, S. O. 91, W. D., 1918, have prepared and approved the following specifications for pneumatic tires, including automobile, motorcycle and bicycle tires; solid motor tires, repair material and accessories. These specifications were revised to November 1, and supersede those published in THE INDIA RUBBER WORLD October 1, 1918.

CLINCHER BICYCLE TIRES.

SIZES 28 BY 1½ INCHES AND 28 BY 1¾ INCHES.

FABRIC CONSTRUCTION.

Specification No. 1221A.

NOVEMBER 1, 1918.

1. GENERAL. (a) Bicycle pneumatic casings manufactured in accordance with this specification shall be of fabric or cord construction of the sizes known as 28 by 1½ inches and 28 by 1¾ inches.

(b) The manufacturer of casings must guarantee them to be free from defects in workmanship and material.

(c) The casings shall be plainly marked with the manufacturer's name and size of tire.

2. TYPE. All casings furnished on this specification shall be of the manufacturer's standard non-skid double clincher type, designed to satisfactorily fit the standard 28 by 1½ inches single clinch all steel bicycle rim.

3. CONSTRUCTION. (a) Carcass of the casings must consist of two plies of fabric frictioned both sides.

(b) All fabric shall be square-woven (26 by 26) having a tensile strength for both warp and filler of not less than 110 pounds per inch or its physical equivalent of cords as approved by the Government. Methods of testing to be the same as provided in the specifications for pneumatic automobile casings.

(c) All fabric must be thoroughly dried in accordance with standard manufacturing practice before it is started through the process of rubberizing.

(d) The tread of the casing shall not be less than 0.120-inch thick.

(e) The sidewall of the casing shall not be less than 0.032-inch thick when measured on the cured casing.

4. PHYSICAL MEASUREMENTS AND TESTS. (a) The cross-sectional diameter of each tire inflated to 40 pounds shall not be less than 1-29/64 inches in 28 by 1½ inches and 1-37/64 inches in 28 by 1¾ inches.

(b) Strength of the union between plies of fabric shall average ten pounds or more per inch using the standard dead weight friction test as provided in the specifications for pneumatic automobile casings.

(c) The strength of the union between tread and plies or between sidewall and plies shall average nine pounds or more using the standard dead weight friction test as above provided.

5. FLAPS. Each casing shall have a flap in accordance with the standard commercial practice.

6. COMPOUNDS. (a) Tread.—The tread shall be made from and have the characteristics of a compound containing at least 55 per cent by volume of the best quality new wild or plantation rubber. The minimum tensile strength shall be 1,600 pounds per square inch with a minimum elongation of 400 per cent (2 to 10 inches) as determined by the average of four test pieces when stretched at the rate of twenty inches per minute. The test pieces shall be cut longitudinally and shall be ¼-inch wide of a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with test pieces as above, shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes. All tests shall be made at a temperature between 65 degrees and 90 degrees F.

(b) Friction.—The friction shall be made from and have the characteristics of a compound containing at least 65 per cent by volume of the best quality new wild or plantation rubber.

(c) Sidewalls.—The sidewalls shall be made from and have the characteristics of a compound containing at least 55 per cent by volume of the best quality new wild or plantation rubber. The minimum tensile strength of the sidewall rubber shall be 1,200 pounds per square inch with a minimum elongation of 400 per cent (2 to 10 inches). The permanent set shall not exceed a maximum of 25 per cent as determined by the average of four tests as described in 6(a).

(d) Compounds shall be free from ingredients known to the rubber trade as oil substitutes.

(e) The manufacturer must state the amount and kind of reclaimed rubber used in all compounds.

(f) All above test pieces must be cut from casings.

7. INSPECTION. The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

8. TUBES. The inner tube shall meet the specifications of the automobile and motorcycle tubes, with the following exceptions: (a) minimum pole size shall be 1-inch; (b) minimum gage shall be 0.048-inch; (c) the valve shall be Schrader's 1022, or its approved equivalent.

9. PACKING. Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC MOTORCYCLE CASINGS (NON-SKID).

SIZE 28 BY 3 INCHES.

FABRIC CONSTRUCTION.

Specification No. 1064A.

NOVEMBER 1, 1918.

1. GENERAL. (a) Pneumatic motorcycle casings manufactured in accordance with this specification shall be of fabric construction of the size known to the trade as 28 by 3 inches.

(b) Casings must be designed to carry a load of 325 pounds, when inflated to 40 pounds per square inch.

(c) The manufacturers of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. TYPE. All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid clincher type, designed for the S. A. E. clincher motorcycle CC rim of the size 28 by 3 inches.

3. CONSTRUCTION. (a) Splices on the first ply of fabric shall be gum-strapped.

(b) Carcass of casing shall consist of four separate plies of tire fabric, with friction coat on two sides and skim coat on one side. The gage of one ply frictioned on two sides and skim-coated on one shall be at least 0.043-inch. Each ply shall have not more than two splices which must be at least seven inches apart measured on the circumference of the casing. The splices in the casing shall be at least three inches apart when measured on the circumference of the casing.

(c) All fabric must be square-woven (23 by 23) from Egyptian long-staple cotton or its physical equivalent as approved by the Government, weighing 17¼ ounces to the square yard with an allowable variance of plus or minus 3 per cent.

(d) All fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operations of rubberizing.

(e) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of fabric shall be employed. All fabric shall be tested in an approved testing machine to determine the tensile strength in the following manner: the distance between the grips on the machine shall be approximately three inches, and the separation of the jaws shall be at the rate of 20 inches per minute. Six samples shall be cut from each roll in such a manner as to eliminate any unnecessary waste of material. Three samples shall be cut longitudinally to determine the warp strength and three samples shall be cut transversely to determine the filler strength. The samples shall be prepared in the following manner: unravel to 23 yards (1-inch width); fabric shall be dried one hour and thirty minutes at 110 degrees C. Breaking test shall be completed within thirty seconds of time of removing test strip from oven. The results must show a tensile strength of not less than 165 pounds per inch width for either warp or filler.

(f) Beads shall be constructed with a core filler as in standard commercial practice.

(g) There shall be a cushion of rubber compound applied over the fabric which shall be wider than the breaker. The minimum gage of this cushion shall be 0.0325-inch.

(h) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of 1½ inches. Breaker shall be made from long-staple cotton weighing not less than 8 ounces per square yard.

(i) The tread of the casing shall not be less than ¼-inch thick in the center, ⅜-inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(j) The sidewall of the casing shall have a minimum thickness of 0.045-inch.

4. PHYSICAL MEASUREMENTS AND TESTS. (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall not be less than 2-15/16 inches nor more than 3-3/10 inches.

(b) Tires shall be capable of withstanding water pressure of 250 pounds per square inch without apparent injury. This test to be made at the discretion of the inspector.

(c) The strength of the union between plies of fabric shall average 16 pounds or more per inch using the standard friction test, viz.: a section of the casing is to be cut one inch in width measured circumferentially. The plies are to be started and pulled down two inches at one head, which head is to be clamped in the jaws of standard friction testing machine. The test shall be made on any ply of fabric in accordance with the standard dead weight friction test. The rate of separation shall not be more than one inch per minute.

(d) Strength of the union between the breaker and tread and between the breaker and cushion shall be not less than 28 pounds per inch using the standard dead weight friction test as above provided.

(e) Strength of the union between cushion and carcass shall be not less than 16 pounds per inch using the standard dead weight friction test as above provided.

(f) Strength of union between sidewall and carcass shall be not less than 10 pounds per inch, using the standard dead weight friction test as above provided.

5. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least one motorcycle used exclusively for test work, and that this same machine averages at least 1,000 machine miles per machine per week.

(b) The speeds, loads, tire sizes, inflations and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b) and a sufficient number of casings satisfactory to the Government, not less than six, have averaged on the rear wheels at least 4,000 miles.

6. LINING. The inside of each casing shall be properly lined in accordance with the standard practice of the tire manufacturers.

7. FLAPS. Each casing shall have a flap cemented inside of the casing in accordance with standard commercial practice.

8. **COMPOUNDS.** (a) **Tread.**—The tread shall be made from and have the characteristics of a compound containing at least 65 per cent by volume of the best quality new wild or plantation rubber. Compound shall be free from ingredients known to the rubber trade as oil substitutes. The minimum tensile strength shall be 2,200 pounds per square inch with a minimum elongation of 450 per cent (2 to 11 inches), as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be $\frac{1}{4}$ -inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with the test pieces as above shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) **Friction and Cushion.**—These shall be made from and have the characteristics of a compound containing at least 75 per cent by volume of the best quality new wild or plantation rubber. The compound shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

(c) **Sidewall.**—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. Reclaimed rubber to the extent of 15 per cent by weight of total compound is allowed, but the amount and kind must be declared by the manufacturer. Compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches) and a maximum set of 25 per cent, tested as specified in 8(a). The compound shall be free of ingredients known to the rubber trade as oil substitutes.

(d) All test pieces must be cut from casings.

9. **INSPECTION.** The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. **WRAPPING AND MARKING.** All casings shall be spirally wrapped according to standard practice and properly labeled on the outside showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. **PACKING.** Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC MOTORCYCLE CASINGS (NON-SKID).

SIZE 29 BY $3\frac{1}{2}$ INCHES.

FABRIC CONSTRUCTION.

Specification No. 1065A.

NOVEMBER 1, 1918.

1. **GENERAL.** (a) Pneumatic motorcycle casings manufactured in accordance with this specification shall be of fabric construction of the size known to the trade as 29 by $3\frac{1}{2}$ inches.

(b) Casings must be designed to carry a load of 400 pounds when inflated to 45 pounds per square inch.

(c) The manufacturers of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. **TYPE.** All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid clincher type, designed for the S. A. E. clincher motorcycle CC rim of the size 28 by 3 inches.

3. **CONSTRUCTION.** (a) Splices on the first ply of fabric shall be gum-stripped.

(b) Carcass of casing shall consist of four separate plies of tire fabric, with friction coat on two sides and skim coat on one side. The gage of one ply frictioned on two sides and skim-coated on one shall be at least 0.043-inch. Each ply shall have not more than two splices which must be at least seven inches apart measured on the circumference of the casing. The splices in the casing shall be at least three inches apart when measured on the circumference of the casing.

(c) All fabric must be square-woven (23 by 23) from Egyptian long-staple cotton or its physical equivalent as approved by the Government, weighing $17\frac{1}{4}$ ounces to the square yard with an allowable variance of plus or minus 3 per cent.

(d) All fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operations of rubberizing.

(e) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of fabric shall be employed. All fabric shall be tested in an approved testing machine to determine the tensile strength in the following manner: the distance between the grips on the machine shall be approximately three inches, and the separation of the jaws shall be at the rate of 20 inches per minute. Six samples shall be cut from each roll in such a manner as to eliminate any unnecessary waste of material. Three samples shall be cut longitudinally to determine the warp strength and three samples shall be cut transversely to determine the filler strength. The samples shall be prepared in the following manner: unravel to 23 yarns (1-inch width); fabric shall be dried one hour and thirty minutes at 110 degrees C. Breaking test shall be completed within thirty seconds of time of removing test strip from oven. The results must show a tensile strength of not less than 165 pounds per inch width for either warp or filler.

(f) Beads shall be constructed with a core filler as in standard commercial practice.

(g) One chafing strip of square-woven fabric weighing not less than 8 ounces per square yard shall be used on each side of the casing. The chafing strip shall extend upward on the side of the casing at least $\frac{3}{8}$ -inch from the channel of the bead.

(h) There shall be a cushion of rubber compound applied over the fabric which shall be wider than the breaker. The minimum gage of this cushion shall be 0.045-inch.

(i) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of $\frac{3}{4}$ inches. Breaker shall be made from long-staple cotton weighing not less than 8 ounces per square yard.

(j) The tread of the casing shall not be less than $\frac{5}{16}$ -inch thick in the center, $\frac{1}{4}$ -inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(k) The sidewall of the casing shall have a minimum thickness of 0.050-inch.

4. **PHYSICAL MEASUREMENTS AND TESTS.** (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall not be less than $3\frac{7}{16}$ inches.

(b) Tires shall be capable of withstanding water pressure of 275 pounds per square inch without apparent injury. This test is to be made at the discretion of the inspector.

(c) The strength of the union between plies of fabric shall average 16 pounds or more per inch, using the standard friction test, viz.: a section of the casing is to be cut one inch in width measured circumferentially. The plies are to be started and pulled down two inches at one bead, which head is to be clamped in the jaws of standard friction testing machine. The test shall be made on any ply of fabric in accordance with the standard dead weight friction test. The rate of separation shall not be more than one inch per minute.

(d) Strength of the union between the breaker and tread and between the breaker and cushion shall be not less than 28 pounds per inch, using the standard dead weight friction test as above provided.

(e) Strength of the union between cushion and carcass shall be not less than 16 pounds per inch, using the standard dead weight friction test as above provided.

(f) Strength of union between sidewall and carcass shall be not less than 10 pounds per inch, using the standard dead weight friction test as above provided.

5. **ROAD TEST.** Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least one motorcycle used exclusively for test work, and that this same machine averages at least 1,000 machine miles per machine per week.

(b) The speeds, loads, tire sizes, inflations and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of casings satisfactory to the Government, not less than six, have averaged on the rear wheels at least 4,000 miles.

6. **LINING.** The inside of each casing shall be properly lined in accordance with the standard practice of the tire manufacturers.

7. **FLAPS.** Each casing shall have a flap cemented into inside of the casing in accordance with standard commercial practice.

8. **COMPOUNDS.** (a) **Tread.**—The tread shall be made from and have the characteristics of a compound containing at least 65 per cent by volume of the best quality new wild or plantation rubber. Compound shall be free from ingredients known to the rubber trade as oil substitutes. The minimum tensile strength shall be 2,200 pounds per square inch with a minimum elongation of 450 per cent (2 to 11 inches), as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be $\frac{1}{4}$ -inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with the test pieces as above shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes, followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) **Friction and Cushion.**—These shall be made from and have the characteristics of a compound containing at least 75 per cent by volume of the best quality new wild or plantation rubber. The compound shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

(c) **Sidewall.**—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. Reclaimed rubber to the extent of 15 per cent by weight of total compound is allowed, but the amount and kind must be declared by the manufacturer. Compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches) and a maximum set of 25 per cent, tested as specified in 8(a). The compound shall be free of ingredients known to the rubber trade as oil substitutes.

(d) All test pieces must be cut from casings.

9. **INSPECTION.** The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. **WRAPPING AND MARKING.** All casings shall be spirally wrapped according to standard practice and properly labeled on the outside, showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. **PACKING.** Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC AUTOMOBILE CASINGS (NON-SKID).

SIZE 30 BY $3\frac{1}{2}$ INCHES.

FABRIC CONSTRUCTION.

Specification No. 1066A.

NOVEMBER 1, 1918.

1. **GENERAL.** (a) Pneumatic automobile casings manufactured in accordance with this specification shall be of fabric construction of the size known to the trade as 30 by $3\frac{1}{2}$ inches.

(b) Casings must be designed to carry a load of 570 pounds when inflated to 55 pounds per square inch.

(c) The manufacturers of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. **TYPE.** All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid clincher type, designed for the S. A. E. clincher rim of the size 30 by $3\frac{1}{2}$ inches.

3. **CONSTRUCTION.** (a) Splices on the first ply of fabric shall be gum-stripped.

(b) Carcass of casing shall consist of not less than four nor more than five separate plies of tire fabric, with friction coat on two sides and skim coat on one side. The gage of one ply frictioned on two sides and skim-coated on one shall be at least 0.045-inch. Each ply shall have not more than two splices, which must be at least seven inches apart measured on

the circumference of the casing. The splices in the casing shall be at least three inches apart when measured on the circumference of the casing.

(c) All fabric must be square-woven (23 by 23) from Egyptian long-staple cotton or its physical equivalent as approved by the Government, weighing 17½ ounces to the square yard with an allowable variance of plus or minus 3 per cent.

(d) All fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operations of rubberizing.

(e) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of fabric shall be employed. All fabric shall be tested in an approved testing machine to determine the tensile strength in the following manner: the distance between the grips on the machine shall be approximately three inches, and the separation of the jaws shall be at the rate of 20 inches per minute. Six samples shall be cut from each roll in such a manner as to eliminate any unnecessary waste of material. Three samples shall be cut longitudinally to determine the warp strength and three samples shall be cut transversely to determine the filler strength. The samples shall be prepared in the following manner: unravel to 23 yards (1-inch width); fabric shall be dried one hour and thirty minutes at 110 degrees C. Breaking test shall be completed within thirty seconds of time of removing test strip from oven. The results must show a tensile strength of not less than 165 pounds per inch width for either warp or filler.

(f) Beads shall be constructed with a core filler as in standard commercial practice.

(g) One chafing strip of square-woven fabric weighing not less than 8 ounces per square yard shall be used on each side of the casing. The chafing strip shall extend upward on the side of the casing at least ¼-inch from the channel of the bead.

(h) There shall be a cushion of rubber compound applied over the fabric which shall be wider than the breaker. The minimum gage of this cushion shall be 0.045-inch.

(i) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of 2½ inches. Breaker shall be made from long-staple cotton weighing not less than 8 ounces per square yard.

(j) The tread of the casing shall not be less than 5/16-inch thick in the center, ¼-inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(k) The sidewall of the casing shall have a minimum thickness of 0.050-inch.

4. PHYSICAL MEASUREMENTS AND TESTS. (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall not be less than 3-7/16 inches.

(b) Tire shall be capable of withstanding water pressure of 300 pounds per square inch without apparent injury. This test is to be made at the discretion of the inspector.

(c) The strength of the union between plies of fabric shall average 16 pounds or more per inch, using the standard friction test viz.: a section of the casing is to be cut one inch in width, measured circumferentially. The plies are to be started and pulled down two inches at one bead, which bead is to be clamped in the jaws of standard friction testing machine. The test shall be made on any ply of fabric in accordance with the standard dead weight friction test. The rate of separation shall not be more than one inch per minute.

(d) Strength of the union between the breaker and tread and between the breaker and cushion shall be not less than 28 pounds per inch, using the standard dead weight friction test as above provided.

(e) Strength of the union between cushion and carcass shall be not less than 16 pounds per inch, using the standard dead weight friction test as above provided.

(f) Strength of union between sidewall and carcass shall be not less than 10 pounds per inch, using the standard dead weight friction test as above provided.

5. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least two cars used exclusively for test work, and that these cars average at least 1,000 car miles per car per week.

(b) The speeds, loads, tire sizes, inflations and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of casings satisfactory to the Government, not less than 6, have averaged on the rear wheels at least 4,000 miles.

6. LINING. The inside of each casing shall be properly lined in accordance with the standard practice of the tire manufacturers.

7. FLAPS. No flaps shall be supplied.

8. COMPOUNDS. (a) Tread.—The tread shall be made from and have the characteristics of a compound containing at least 65 per cent by volume of the best quality new wild or plantation rubber. Compound shall be free from ingredients known to the rubber trade as oil substitutes. The minimum tensile strength shall be 2,200 pounds per square inch with a minimum elongation of 450 per cent (2 to 11 inches) as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be ¼ inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with the test pieces as above shall not exceed 25 per cent after elongation of 400 per cent (2 to 10 inches) for ten minutes followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) Friction and Cushion.—These shall be made from and have the characteristics of a compound containing at least 75 per cent by volume of the best quality new wild or plantation rubber. The compound shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

(c) Sidewall.—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. Reclaimed rubber to the extent of 15 per cent by weight of total compound is allowed, but the amount and kind must be declared by the manufacturer. Compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches) and a maximum set of 25 per cent, tested as specified in 8(a). The compound shall be free of ingredients known to the rubber trade as oil substitutes.

(d) All test pieces must be cut from casings.

9. INSPECTION. The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. WRAPPING AND MARKING. All casings shall be spirally wrapped according to standard practice and properly labeled on the outside, showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. PACKING. Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC AUTOMOBILE CASINGS (NON-SKID).

SIZE 31 BY 4 INCHES.

FABRIC CONSTRUCTION.

Specification No. 1063A.

NOVEMBER 1, 1918.

1. GENERAL. (a) Pneumatic automobile casings manufactured in accordance with this specification shall be of fabric construction of the size known to the trade as 31 by 4 inches.

(b) Casings must be designed to carry a load of 815 pounds when inflated to 65 pounds per square inch.

(c) The manufacturers of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire. As soon as possible it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. TYPE. All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid clincher type, designed for the S. A. E. clincher rim of the size 30 by 3½ inches.

3. CONSTRUCTION. (a) Splices on the first ply of fabric shall be gum-stripped.

(b) Carcass of casing shall consist of not less than five nor more than six separate plies of tire fabric, with friction coat on two sides and skim coat on one side. The gage of one ply frictioned on two sides and skim-coated on one shall be at least 0.045-inch. Each ply shall have not more than two splices which must be at least seven inches apart measured on the circumference of the casing. The splices in the casing shall be at least three inches apart when measured on the circumference of the casing.

(c) All fabric must be square-woven (23 by 23) from Egyptian long-staple cotton or its physical equivalent as approved by the Government, weighing 17½ ounces to the square yard with an allowable variance of plus or minus 3 per cent.

(d) All fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operations of rubberizing.

(e) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of fabric shall be employed. All fabric shall be tested in an approved testing machine to determine the tensile strength in the following manner: the distance between the grips on the machine shall be approximately three inches, and the separation of the jaws shall be at the rate of 20 inches per minute. Six samples shall be cut from each roll in such a manner as to eliminate any unnecessary waste of material. Three samples shall be cut longitudinally to determine the warp strength and three samples shall be cut transversely to determine the filler strength. The samples shall be prepared in the following manner: unravel to 23 yards (1-inch width); fabric shall be dried one hour and thirty minutes at 110 degrees C. Breaking test shall be completed within thirty seconds of time of removing test strip from oven. The results must show a tensile strength of not less than 165 pounds per inch width for either warp or filler.

(f) Beads shall be constructed with a core filler as in standard commercial practice.

(g) One chafing strip of square-woven fabric weighing not less than 8 ounces per square yard shall be used on each side of the tire. The chafing strip shall extend upward on the side of the tire at least ¼-inch from the channel of the bead.

(h) There shall be a cushion of rubber compound applied over the fabric which shall be wider than the breaker. The minimum gage of this cushion shall be 0.050-inch.

(i) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of 2½ inches. Breaker shall be made from long-staple cotton weighing not less than 8 ounces per square yard.

(j) The tread of the casing shall be not less than ¼-inch thick in the center, ¼-inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(k) The sidewall of the casing shall have a minimum thickness of 0.050-inch.

4. PHYSICAL MEASUREMENTS AND TESTS. (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall not be less than 4 inches.

(b) Tire shall be capable of withstanding water pressure of 300 pounds per square inch without apparent injury. This test is to be made at the discretion of the inspector.

(c) The strength of the union between plies of fabric shall average 16 pounds or more per inch using the standard friction test viz.: a section of the casing is to be cut one inch in width measured circumferentially. The plies are to be started and pulled down two inches at one bead, which bead is to be clamped in the jaws of standard friction testing machine. The test shall be made on any ply of fabric in accordance with the standard dead weight friction test. The rate of separation shall not be more than one inch per minute.

(d) Strength of the union between the breaker and tread and between the breaker and cushion shall be not less than 28 pounds per inch, using the standard dead weight friction test as above provided.

(e) Strength of the union between cushion and carcass shall be not less than 16 pounds per inch, using the standard dead weight friction test as above provided.

(f) Strength of union between sidewall and carcass shall be not less than 10 pounds per inch, using the standard dead weight friction test as above provided.

5. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least two cars used exclusively for test work, and that these cars average at least 1,000 car miles per car per week.

(b) The speeds, loads, tire sizes, inflations and road conditions must

be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of casings satisfactory to the Government, not less than six, have averaged on the rear wheels at least 4,000 miles.

6. LINING. The inside of each casing shall be properly lined in accordance with the standard practice of the tire manufacturers.

7. FLAPS. No flaps shall be supplied.

8. COMPOUNDS. (a) Tread.—The tread shall be made from and have the characteristics of a compound containing at least 65 per cent by volume of the best quality new wild or plantation rubber. Compound shall be free from ingredients known to the rubber trade as oil substitutes. The minimum tensile strength shall be 2,200 pounds per square inch with a minimum elongation of 450 per cent (2 to 11 inches) as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be $\frac{1}{4}$ -inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with the test pieces as above shall not exceed 25 per cent after elongation of 400 per cent (2 to 10 inches) for ten minutes followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) Friction and Cushion.—These shall be made from and have the characteristics of a compound containing at least 75 per cent by volume of the best quality new wild or plantation rubber. The compound shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

(c) Sidewall.—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. Reclaimed rubber to the extent of 15 per cent by weight of total compound is allowed, but the amount and kind must be declared by the manufacturer. Compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches) and a maximum set of 25 per cent, tested as specified in 8(a). The compound shall be free of ingredients known to the rubber trade as oil substitutes.

(d) All test pieces must be cut from casings.

9. INSPECTION. The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. WRAPPING AND MARKING. All casings shall be spirally wrapped according to standard practice and properly labeled on the outside, showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. PACKING. Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC AUTOMOBILE CASINGS (RIBBED OR NON-SKID).

SIZE 33 BY 4 INCHES.

CORD CONSTRUCTION.

Specification No. 1068A.

NOVEMBER 1, 1918.

1. GENERAL. (a) Pneumatic automobile casings manufactured in accordance with this specification shall be of cord construction, of the size known to the trade as 33 by 4 inches.

(b) Casings must be designed to carry a load of 815 pounds when inflated to 65 pounds per square inch.

(c) The manufacturer of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible, it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. TYPE. All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid or ribbed (as ordered) straight side type designed for the standard S. A. E. straight side rim of the size of 32 by $3\frac{1}{2}$ inches and the new size 33 by 4 inches.

3. CONSTRUCTION. (a) Carcass of casing shall consist of not less than four nor more than eight separate plies of cord applied in such a manner that an equal number of plies shall run in each diagonal direction across the casing.

(b) All cord material to be of the best quality combed Sea Island or Sakellarides cotton or their physical equivalent as approved by the Government.

(c) All cord fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operation of rubberizing.

(d) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of cord fabric shall be employed, and tests to determine tensile strength of cords shall be made on ten individual cords taken from each roll. The results shown must be up to the standard specification of the individual manufacturer.

(e) Two chafing strips of fabric weighing not less than eight ounces per square yard, shall be used on each side of the casing. Each chafing strip shall extend upward on the side of the casing at least one inch from the heel of the bead. One chafing strip shall extend at least $3/16$ -inch above the other.

(f) There shall be a cushion of rubber compound applied over the cords which shall be wider than the breaker. The minimum gage of this cushion shall be 0.050-inch.

(g) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of $2\frac{3}{4}$ inches. Breaker shall be made from long-staple Egyptian cotton or its physical equivalent as approved by the Government and shall weigh not less than ten ounces per square yard.

(h) The tread of the casing shall not be less than $\frac{3}{16}$ -inch thick in the center, $\frac{1}{4}$ -inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(i) The sidewall of the casing shall have a minimum thickness of 0.0625-inch.

4. PHYSICAL MEASUREMENTS AND TESTS. (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall be not less than 4.2 inches.

(b) Tires shall be capable of withstanding water pressure of 350 pounds per square inch without apparent injury. This test is to be made at the discretion of the inspector.

(c) The minimum strength of the casing shall be 2,000 pounds. This "strength factor" is the product of the number of cords per inch measured at the tread at right angles to the cords multiplied by the strength of the individual cord as taken from the cord tire multiplied by the number of plies.

(d) The strength of the union between breaker and tread and between breaker and cushion shall be not less than 32 pounds per inch, using the standard dead weight friction test as provided in paragraph No. 4, fabric casing specifications.

(e) Strength of the union between sidewall and plies shall average 14 pounds or more per inch, using the standard dead weight friction test as above provided.

(f) Strength of the union between cushion and plies shall average 16 pounds or more per inch, using the standard dead weight friction test as above provided.

5. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least two cars used exclusively for test work, and that these cars average at least 1,000 car miles per car per week.

(b) The speeds, loads, tire sizes, inflations and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of casings satisfactory to the Government, not less than six, have averaged on the rear wheels at least 5,000 miles.

6. LINING. The inside of each casing shall be properly lined in accordance with the standard practice of tire manufacturers.

7. FLAPS. A flap shall be furnished with each casing, as in standard commercial practice.

8. COMPOUNDS. (a) Tread.—The tread shall be made from and have the characteristics of a compound containing at least 70 per cent by volume of the best quality new wild or plantation rubber. The minimum tensile strength shall be 2,400 pounds to the square inch, with a minimum elongation of 500 per cent (2 to 12 inches) as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be $\frac{1}{4}$ -inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with test pieces as above, shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes, followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) Friction and Cushion.—These shall be made from and have the characteristics of a compound containing at least 85 per cent by volume of the best quality new wild or plantation rubber.

(c) Sidewall.—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. The compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches). The permanent set shall not exceed a maximum of 25 per cent tested as specified in 8(a).

(d) All above test pieces must be cut from casings.

(e) The above compounds shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

9. INSPECTION. The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. WRAPPING AND MARKING. All casings shall be spirally wrapped according to standard practice and properly labeled on the outside, showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. PACKING. Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC AUTOMOBILE CASINGS (RIBBED OR NON-SKID).

SIZE 35 BY 5 INCHES.

CORD CONSTRUCTION.

Specification No. 1069A.

NOVEMBER 1, 1918.

1. GENERAL. (a) Pneumatic automobile casings manufactured in accordance with this specification shall be of cord construction, of the size known to the trade as 35 by 5 inches.

(b) Casings must be designed to carry a load of 1,500 pounds when inflated to 75 pounds per square inch.

(c) The manufacturer of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible, it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. TYPE. All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid or ribbed (as ordered) straight side type designed for the standard S. A. E. straight side rim of the size 34 by $4\frac{1}{2}$ inches.

3. CONSTRUCTION. (a) Carcass of casing shall consist of not less than four nor more than ten separate plies of cord applied in such a manner that an equal number of plies shall run in each diagonal direction across the casing.

(b) All cord material to be of the best quality combed Sea Island or Sakellarides cotton or their physical equivalent as approved by the Government.

(c) All cord fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operations of rubberizing.

(d) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of cord fabric shall be employed, and tests to determine tensile strength of cords shall be made on ten individual cords taken from each roll. The results shown must be up to the standard specification of the individual manufacturer.

(e) Two chafing strips of fabric weighing not less than eight ounces per square yard, shall be used on each side of the casing. Each chafing strip shall extend upward on the side of the casing at least $1\frac{1}{2}$ inches from the

heel of the bead. One chafing strip shall extend at least 3/16-inch above the other.

(f) There shall be a cushion of rubber compound applied over the cords which shall be wider than the breaker. The minimum gage of this cushion shall be 0.0625-inch.

(g) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of 3 1/4 inches. Breaker shall be made from long-staple Egyptian cotton or its physical equivalent as approved by the Government and shall weigh not less than ten ounces per square yard.

(h) The tread of the casing shall not be less than 7/16-inch thick in the center, 3/16-inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(i) The sidewall of the casing shall have a minimum thickness of 0.0625-inch.

4. PHYSICAL MEASUREMENTS AND TESTS. (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall be not less than 3.4 inches.

(b) Tires shall be capable of withstanding water pressure of 350 pounds per square inch without apparent injury. This test is to be made at the discretion of the inspector.

(c) The minimum strength of the casing shall be 2,500 pounds. This "strength factor" is the product of the number of cords per inch measured at the tread at right angles to the cords, multiplied by the strength of the individual cord as taken from the cord casing, multiplied by the number of plies.

(d) The strength of the union between breaker and tread and between breaker and cushion shall be not less than 32 pounds per inch, using the standard dead weight friction test as provided in paragraph No. 4, fabric casing specifications.

(e) Strength of the union between sidewall and plies shall average 14 pounds or more per inch, using the standard dead weight friction test as above provided.

(f) Strength of the union between cushion and plies shall average 16 pounds or more per inch, using the standard dead weight friction test as above provided.

5. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least two cars used exclusively for test work, and that these cars average at least 1,000 car miles per car per week.

(b) The speeds, loads, tire sizes, inflations and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of casings satisfactory to the Government, not less than six, have averaged on the rear wheels at least 5,000 miles.

6. LINING. The inside of each casing shall be properly lined in accordance with the standard practice of tire manufacturers.

7. FLAPS. A flap shall be furnished with each casing, as in standard commercial practice.

8. COMPOUNDS. (a) Tread.—The tread shall be made from and have the characteristics of a compound containing at least 70 per cent by volume of the best quality new wild or plantation rubber. The minimum tensile strength shall be 2,400 pounds to the square inch, with a minimum elongation of 500 per cent (2 to 12 inches) as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be 1/4-inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with test pieces as above, shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes, followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) Friction and Cushion.—These shall be made from and have the characteristics of a compound containing at least 85 per cent by volume of the best quality new wild or plantation rubber.

(c) Sidewall.—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. The compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches). The permanent set shall not exceed a maximum of 25 per cent, tested as specified in 8(a).

(d) All above test pieces must be cut from casings.

(e) The above compounds shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

9. INSPECTION. The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. WRAPPING AND MARKING. All casings shall be spirally wrapped according to standard practice and properly labeled on the outside showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. PACKING. Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC AUTOMOBILE CASINGS (RIBBED OR NON-SKID).

SIZE 36 BY 6 INCHES.

CORD CONSTRUCTION.

Specification No. 1070A.

NOVEMBER 1, 1918.

1. GENERAL. (a) Pneumatic automobile casings manufactured in accordance with this specification shall be of cord construction, of the size known to the trade as 36 by 6 inches.

(b) Casings must be designed to carry a load of 2,000 pounds when inflated to 90 pounds per square inch.

(c) The manufacturer of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible, it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2 TYPE. All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid or ribbed (as ordered) straight side type designed for the standard S. A. E. straight side rim of the size 36 by 6 inches.

3. CONSTRUCTION. (a) Carcass of casings shall consist of not less than four nor more than twelve separate plies of cord applied in such a manner that an equal number of plies shall run in each diagonal direction across the casing.

(b) All cord material to be of the best quality combed Sea Island or Sakellarides cotton or their physical equivalent as approved by the Government.

(c) All cord fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operations of rubberizing.

(d) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of cord fabric shall be employed, and tests to determine tensile strength of cords shall be made on ten individual cords taken from each roll. The results shown must be up to the standard specification of the individual manufacturer.

(e) Two chafing strips of fabric weighing not less than eight ounces per square yard shall be used on each side of the casing. Each chafing strip shall extend upward on the side of the casing at least 1 1/4 inches from the heel of the bead. One chafing strip shall extend at least 3/4-inch above the other.

(f) There shall be a cushion of rubber compound applied over the cords which shall be wider than the breaker. The minimum gage of this cushion shall be 0.080-inch.

(g) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of 4 1/4 inches. Breaker shall be made from long-staple Egyptian cotton or its physical equivalent as approved by the Government and shall weigh not less than ten ounces per square yard.

(h) The tread of the casing shall not be less than 9/16-inch thick in the center, 7/32-inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(i) The sidewall of the casing shall have a minimum thickness of 0.0625-inch.

4. PHYSICAL MEASUREMENTS AND TESTS. (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall be not less than 6.3 inches.

(b) Tires shall be capable of withstanding water pressure of 350 pounds per square inch without apparent injury. This test is to be made at the discretion of the inspector.

(c) The minimum strength of the casing shall be 3,000 pounds. This "strength factor" is the product of the number of cords per inch measured at the tread at right angles to the cords, multiplied by the strength of the individual cord as taken from the cord casing, multiplied by the number of plies.

(d) The strength of the union between breaker and tread and between breaker and cushion shall be not less than 32 pounds per inch, using the standard dead weight friction test as provided in paragraph No. 4, fabric casing specifications.

(e) Strength of the union between sidewall and plies shall average 14 pounds or more per inch, using the standard dead weight friction test as above provided.

(f) Strength of the union between cushion and plies shall average 16 pounds or more per inch, using the standard dead weight friction test as above provided.

5. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least two cars used exclusively for test work, and that these cars average at least 500 car miles per car per week.

(b) The speeds, loads (which may be of merchandise), tire sizes, inflations and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of casings satisfactory to the Government, not less than four, have averaged on the rear wheels at least 5,000 miles.

6. LINING. The inside of each casing shall be properly lined in accordance with the standard practice of tire manufacturers.

7. FLAPS. A flap shall be furnished with each casing, as in standard commercial practice.

8. COMPOUNDS. (a) Tread.—The tread shall be made from and have the characteristics of a compound containing at least 70 per cent by volume of the best quality new wild or plantation rubber. The minimum tensile strength shall be 2,400 pounds to the square inch, with a minimum elongation of 500 per cent (2 to 12 inches) as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be 1/4-inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with test pieces as above, shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes, followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) Friction and Cushion.—These shall be made from and have the characteristics of a compound containing at least 85 per cent by volume of the best quality new wild or plantation rubber.

(c) Sidewall.—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. The compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches). The permanent set shall not exceed a maximum of 25 per cent, tested as specified in 8(a).

(d) All above test pieces must be cut from casings.

(e) The above compounds shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

9. INSPECTION. The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. WRAPPING AND MARKING. All casings shall be spirally wrapped according to standard practice and properly labeled on the outside, showing the size and type, and name of manufacturer. A label with the month and

year of manufacture stamped on it shall be pasted in a conspicuous place.

11. **PACKING.** Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC AUTOMOBILE CASINGS (RIBBED OR NON-SKID).

SIZE 38 BY 7 INCHES.

CORD CONSTRUCTION.

Specification No. 1071A.

NOVEMBER 1, 1918.

1. **GENERAL.** (a) Pneumatic automobile casings manufactured in accordance with this specification shall be of cord construction, of the size known to the trade as 38 by 7 inches.

(b) Casings must be designed to carry a load of 2,700 pounds when inflated to 100 pounds per square inch.

(c) The manufacturer of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible, it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. **TYPE.** All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid or ribbed (as ordered) straight side type designed for the standard S. A. E. straight side rim of the size 38 by 7 inches.

3. **CONSTRUCTION.** (a) Carcass of casing shall consist of not less than four nor more than fourteen separate plies of cord applied in such a manner that an equal number of plies shall run in each diagonal direction across the casing.

(b) All cord material to be of the best quality combed Sea Island or Sakellarides cotton or their physical equivalent as approved by the Government.

(c) All cord fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operation of rubberizing.

(d) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of cord fabric shall be employed, and tests to determine tensile strength of cords shall be made on ten individual cords taken from each roll. The results shown must be up to the standard specification of the individual manufacturer.

(e) Two chafing strips of fabric weighing not less than twelve ounces per square yard, shall be used on each side of the casing. Each chafing strip shall extend upward on the side of the casing at least 1 1/4 inches from the heel of the bead. One chafing strip shall extend at least 1/4-inch above the other.

(f) There shall be a cushion of rubber compound applied over the cords which shall be wider than the breaker. The minimum gage of this cushion shall be 0.080-inch.

(g) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of 5 1/4 inches. Breaker shall be made from long-staple Egyptian cotton or its physical equivalent as approved by the Government and shall weigh not less than eighteen ounces per square yard.

(h) The tread of the casing shall not be less than 3/4-inch thick in the center, 1/2-inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(i) The sidewall of the casing shall have a minimum thickness of 0.0625-inch.

4. **PHYSICAL MEASUREMENTS AND TESTS.** (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall be not less than 7.35 inches.

(b) Tires shall be capable of withstanding water pressure of 350 pounds per square inch without apparent injury. This test is to be made at the discretion of the inspector.

(c) The minimum strength of the casing shall be 3,500 pounds. This "strength factor" is the product of the number of cords per inch measured at the tread at right angles to the cords, multiplied by the strength of the individual cord as taken from the cord casing, multiplied by the number of plies.

(d) The strength of the union between breaker and tread and between breaker and cushion shall be not less than 32 pounds per inch using the standard dead weight friction test as provided in paragraph No. 4, fabric casing specifications.

(e) Strength of the union between sidewall and plies shall average 14 pounds or more per inch, using the standard dead weight friction test as above provided.

(f) Strength of the union between cushion and plies shall average 16 pounds or more per inch, using the standard dead weight friction test as above provided.

5. **ROAD TEST.** Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained, and will continue to maintain at least two cars used exclusively for test work, and that these cars average at least 500 car miles per car per week.

(b) The speeds, loads (which may be of merchandise), tire sizes, inflations and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b) and a sufficient number of casings satisfactory to the Government, not less than four, have averaged on the rear wheels at least 5,000 miles.

6. **LINING.** The inside of each casing shall be properly lined in accordance with the standard practice of tire manufacturer.

7. **FLAPS.** A flap shall be furnished with each casing, as in standard commercial practice.

8. **COMPOUNDS.** (a) **Tread.**—The tread shall be made from and have the characteristics of a compound containing at least 70 per cent by volume of the best quality new wild or plantation rubber. The minimum tensile strength shall be 2,400 pounds to the square inch, with a minimum elongation of 500 per cent (2 to 12 inches) as determined by the average of four test pieces when stretched at the rate of 30 inches per minute. The test pieces shall be cut longitudinally and shall be 3/4-inch wide over a gage length of 2 inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with test pieces as above, shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes, followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) **Friction and Cushion.**—These shall be made from and have the characteristics of a compound containing at least 85 per cent by volume of the best quality new wild or plantation rubber.

(c) **Sidewall.**—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. The compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches). The permanent set shall not exceed a maximum of 25 per cent, tested as specified in 8(a).

(d) All above test pieces must be cut from casings.

(e) The above compounds shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

9. **INSPECTION.** The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. **WRAPPING AND MARKING.** All casings shall be spirally wrapped according to standard practice and properly labeled on the outside showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. **PACKING.** Packing shall be as per specifications accompanying the request for bid.

PNEUMATIC AUTOMOBILE CASINGS (RIBBED OR NON-SKID)

SIZE 40 BY 8 INCHES.

CORD CONSTRUCTION.

Specification No. 1072A.

NOVEMBER 1, 1918.

1. **GENERAL.** (a) Pneumatic automobile casings manufactured in accordance with this specification shall be of cord construction of the size known to the trade as 40 by 8 inches.

(b) Casings must be designed to carry a load of 3,650 pounds when inflated to 110 pounds per square inch.

(c) The manufacturer of casings must guarantee them to be free from defects in material and workmanship.

(d) Casings shall be plainly marked with manufacturer's name, serial number and size of tire.

(e) As soon as possible, it is desired that all casings be marked with the equivalent metric sizes as recommended by the Society of Automotive Engineers.

2. **TYPE.** All casings manufactured in accordance with this specification shall be of the manufacturer's standard non-skid or ribbed (as ordered) straight side type designed for the standard S. A. E. straight side rim of the size 40 by 8 inches.

3. **CONSTRUCTION.** (a) Carcass of casing shall consist of not less than four nor more than sixteen separate plies of cord applied in such a manner that an equal number of plies shall run in each diagonal direction across the casing.

(b) All cord material to be of the best quality combed Sea Island or Sakellarides cotton or their physical equivalent as approved by the Government.

(c) All cord fabric must be thoroughly dried according to standard manufacturing practice before it is started through the operations of rubberizing.

(d) The usual methods of inspection used by tire companies in commercial practice to discover defects in each roll of cord fabric shall be employed, and tests to determine tensile strength of cords shall be made on ten individual cords taken from each roll. The results shown must be up to the standard specification of the individual manufacturer.

(e) Two chafing strips of fabric weighing not less than twelve ounces per square yard, shall be used on each side of the casing. Each chafing strip shall extend upward on the side of the casing at least two inches from the heel of the bead. One chafing strip shall extend at least 1/4-inch above the other.

(f) There shall be a cushion of rubber compound applied over the cords which shall be wider than the breaker. The minimum gage of this cushion shall be 0.090-inch.

(g) Over the cushion there shall be at least one breaker strip of open-weave fabric such as is used in standard commercial practice, coated on both sides with a rubber compound having the physical and chemical properties of a nature to form a perfect union between the cushion and tread when the cure is effected. This breaker strip shall have a minimum width of 6 1/4 inches. Breaker shall be made from long-staple Egyptian cotton or its physical equivalent as approved by the Government and shall weigh not less than eighteen ounces per square yard.

(h) The tread of the casing shall not be less than 11/16-inch thick in the center, 1/2-inch of which shall be the minimum thickness for that part of the tread under the middle of the non-skid portion.

(i) The sidewall of the casing shall have a minimum thickness of 0.0625-inch.

4. **PHYSICAL MEASUREMENTS AND TESTS.** (a) Cross-sectional diameter of each tire inflated according to the recommended weight and load schedule of the S. A. E. shall be not less than 8.4 inches.

(b) Tires shall be capable of withstanding water pressure of 350 pounds per square inch without apparent injury. The test is to be made at the discretion of the inspector.

(c) The minimum strength of the casing shall be 4,000 pounds. This "strength factor" is the product of the number of cords per inch measured at the tread at right angles to the cords, multiplied by the strength of the individual cord as taken from the cord casing, multiplied by the number of plies.

(d) The strength of the union between breaker and tread and between breaker and cushion shall be not less than 32 pounds per inch using the standard dead weight friction test as provided in paragraph No. 4, fabric casing specifications.

(e) Strength of the union between sidewall and plies shall average 14 pounds or more per inch, using the standard dead weight friction test as above provided.

(f) Strength of the union between cushion and plies shall average 16 pounds or more per inch, using the standard dead weight friction test as above provided.

5. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Casings will not be given consideration unless the maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least two cars used exclusively for test work, and that these cars average at least 500 car miles per car per week.

(b) The speeds, loads (which may be of merchandise), tire sizes, inflation and road conditions must be such that the casings are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any casings to the Government, stating that the casings to be delivered are the same cross-section and practically duplicate, in construction and material, casings which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of casings satisfactory to the Government, not less than four, have averaged on the rear wheels at least 5,000 miles.

6. LINING. The inside of each casing shall be properly lined in accordance with the standard practice of tire manufacturer.

7. FLAPS. A flap shall be furnished with each casing, as in standard commercial practice.

8. COMPOUNDS. (a) Tread.—The tread shall be made from and have the characteristics of a compound containing at least 70 per cent by volume of the best quality new wild or plantation rubber. The minimum tensile strength shall be 2,400 pounds to the square inch, with a minimum elongation of 500 per cent (2 to 12 inches) as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut longitudinally and shall be $\frac{1}{4}$ -inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with test pieces as above, shall not exceed 25 per cent after an elongation of 400 per cent (2 to 10 inches) for ten minutes, followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) Friction and Cushion.—These shall be made from and have the characteristics of a compound containing at least 85 per cent by volume of the best quality new wild or plantation rubber.

(c) Sidewall.—The sidewall shall be made from and have the characteristics of a compound containing a minimum of 65 per cent by volume of the best quality new wild or plantation rubber. The compound shall have a minimum tensile strength of 1,500 pounds per square inch and a minimum elongation of 450 per cent (2 to 11 inches). The permanent set shall not exceed a maximum of 25 per cent, tested as specified in 8(a).

(d) All above test pieces must be cut from casings.

(e) The above compounds shall be free of ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber.

9. INSPECTION. The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of this specification.

10. WRAPPING AND MARKING. All casings shall be spirally wrapped according to standard practice and properly labeled on the outside showing the size and type, and name of manufacturer. A label with the month and year of manufacture stamped on it shall be pasted in a conspicuous place.

11. PACKING. Packing shall be as per specifications accompanying the request for bid.

SOLID MOTOR TIRES.

Specification No. 1074A.

NOVEMBER 1, 1918.

1. TYPE. The tires to be furnished shall be "pressed on" type, provided with the standard channel base band of tire manufacturers, and shall be suitable for pressing on to S. A. E. standard felloe bands for commercial sized wheels or bands built to S. A. E. tolerance for artillery wheels.

2. RUBBER. The rubber compound shall contain not less than 65 per cent by volume of best quality new wild or plantation rubber. If reclaimed rubber or mineral rubber is used, it must be in addition to the 65 per cent of new rubber required, and the manufacturer must declare the amount and kind of reclaimed rubber or rubber substitutes used in his formula. The use of "refined" or ground vulcanized rubber in the compounds will not be permitted.

3. SULPHUR. The total sulphur shall not be more than 8 per cent of the weight of the new rubber used except as follows: if the manufacturer desires to use sulphur-bearing fillers, thereby causing the total sulphur to be over 8 per cent of the weight of new rubber, he may do so, but shall submit for analysis a sample of the finished unvulcanized stock. Such stock shall not show a sulphur content in the acetone extract of over 8 per cent of the weight of new rubber used.

4. SAPONIFIABLE MATTER. The rubber compound shall be free from saponifiable oils, or anything made from them.

5. CHEMICAL TESTS. Where chemical tests are used, they shall be made in accordance with the Bureau of Standards methods.

6. TENSILE STRENGTH. The average tensile strength of rubber compound shall not be less than 1,800 pounds per square inch if the specific gravity is 1.40 or over. If the specific gravity is less than 1.40 the minimum tensile strength shall be 2,000 pounds per square inch. Five samples shall be cut from each tire under test; the samples to be cut in such a manner as to give the proper shape of testing strip for a testing of the stretch and set. The center of test sample shall be $\frac{1}{4}$ -inch thick by $\frac{1}{4}$ -inch wide and one inch long. The samples shall be kept in the testing room until they obtain a uniform temperature of from 65 to 90 degrees F. The average shall be taken on not less than five samples. Pieces obviously defective will not be considered in calculating the average result.

7. STRETCH. The one-inch straight length of test piece above referred to shall stretch to total length of 4 $\frac{1}{2}$ inches before breaking. The sample shall be stretched at the rate of 20 inches per minute.

8. SET. The increased length of the one-inch test section of rubber referred to shall be not more than 40 per cent of the original length two minutes after the rupture.

9. AGING. Prepare five flat samples of rubber to be tested; place in an oven for two hours at a temperature of 228 degrees F. After removing from the oven, allow to stand for 24 hours and determine elongation. The reduction in elongation at the breaking point shall be not over 35 per cent.

10. ADHESION. The adhesion test shall be made as follows: (a) place tire horizontally on platen of tire applying press, the tire being supported above the lower platen of the press on a steel band having the same diameter as the base of the tire to be tested. Place on the upper side of

the tread a band $\frac{1}{4}$ -inch thick with inside diameter $1\frac{1}{4}$ inches larger than outside diameter of flange of base band. The corners of the band to be rounded with $\frac{1}{4}$ -inch radius. The various sizes of tires are to be submitted respectively to pressures in accordance with the following table. For the tire to pass successfully, the hard rubber must not break loose from the base.

Size of Tire.	In. Dia. of Press. Ring.	Lbs. per Lin. In.	Press. in Tons on Tire Max.	Size of Tire.	In. Dia. of Press. Ring.	Lbs. per Lin. In.	Press. in Tons on Tire Max.
32 by 3	29	175	8	32 by 3½	29	220	10
34 by 3	31	...	9	34 by 3½	31	...	11
36 by 3	33	...	9	36 by 3½	33	...	11
32 by 4	29	325	14	32 by 5	29	400	18
34 by 4	31	...	16	34 by 5	31	...	19
36 by 4	33	...	17	36 by 5	33	...	21
38 by 4	35	...	18	38 by 5	35	...	23
40 by 4	37	...	19	40 by 5	37	...	23
42 by 4	39	...	20	42 by 5	39	...	24
32 by 6	29	475	21	36 by 7	33	550	28
34 by 6	31	...	23	38 by 7	35	...	30
36 by 6	33	...	24	40 by 7	37	...	31
38 by 6	35	...	26	42 by 7	39	...	33
40 by 6	37	...	27	36 by 8	33	...	29
42 by 6	39	...	29	40 by 8	37	...	33
1,110 by 100 mm.	47	325	24	1,000 by 125 mm.	43	400	27

11. REBOUND TEST. The rebound shall be not less than 50 as measured on a Whitney rebound instrument. The tire under test shall be held at 70 degrees F. for a period of 24 hours before testing and the instrument shall be mounted rigidly in a vertical position. The tire shall be hung on a solid anvil below the instrument.

12. NUMBER OF TIRES TO BE TESTED. One tire in each lot of five hundred (the tire to be selected by the inspector) shall be tested, and if the tire subjected to test fulfils all the requirements of the specifications the lot of tires represented by it will be accepted, including the tire on which the tests have been made. If the tire subjected to test fails to fulfil the requirements of the specifications in any particular, the lot of tires represented by it, including the tire on which tests have been made, will be rejected. If, however, the maker of the tires demands a further test, three more tires from the lot rejected will be selected by the inspector, and, if all tires are found satisfactory, the lot of tires represented by the tires subjected to test will be accepted and the Government will pay 50 per cent of the cost of tires on which tests have been made. If any tire fails in the latter tests the whole lot will be rejected.

13. ROAD TEST. Manufacturers bidding on government requirements must meet the following conditions:

(a) Tires will not be given consideration unless maker submitting the bid furnishes an affidavit stating that he has maintained and will continue to maintain at least one truck used exclusively for test work, and that this truck averages at least 500 truck miles per week.

(b) The speeds, tire sizes, loads (which may be merchandise), and road conditions must be such that the tires are properly tested. The Government may appoint an inspector to see that the above conditions are complied with.

(c) A bidder must supply an affidavit before delivering any tires to the Government, stating that the tires to be delivered are practically duplicated in construction and material of tires which he has previously tested in accordance with paragraphs (a) and (b), and a sufficient number of tires satisfactory to the Government, at least four tires, have averaged, on the rear wheels, at least 7,000 miles.

Tests on tires of 5-inch cross-section size, or larger, will be considered by the Government as representative of all solid tire cross-section sizes.

14. MARKING. All tires will have molded on the side of the tread rubber, the tire size, i. e., the width and diameter and also the rubber compound or specification number, the tire serial number, month and year of manufacture, and name of the manufacturer.

The tires shall also have marked, by stamping deeply into the steel tire channel, the tire serial number and a symbol representing the name of the manufacturer. The above data shall be stamped under the overhanging edge of the steel channel. In case of artillery tires they shall be marked according to blue-print submitted.

15. SECTION OF TIRES.—Full-sized drawings shall be submitted with proposals showing the exact section of the tires which it is proposed to furnish. Sample section of the actual tire in each size shall also be submitted.

16. WEIGHTS AND AREAS. The total weight of tire, weight of rubber, weight of steel base band, together with the total sectional area of tread rubber in tires and also the area of tread rubber above the tops of steel channels must be definitely stated in proposals, and this data will be given due consideration in connection with the prices submitted.

17. GROOVING OF TIRES.—Tire 10 inches in width and larger shall be provided with approved grooving on face of tire.

18. GUARANTEE. The manufacturer of tires must guarantee them to be free from defects in material and workmanship.

19. BASE BAND.—The tire base shall be made of open hearth steel and rolled to approximate finished dimensions. Chemical analysis shall be as follows: carbon, 0.12 to 0.22—0.17 desired; manganese, 0.35 to 0.55; phosphorous less than 0.04; sulphur less than 0.05.

Base bands are to be electrically welded. They shall be truly circular and free from appreciable warp.

DIMENSIONS OF BASE BANDS. The inside circumference of base bands of tires of standard S. A. E. commercial sizes shall be in accordance with standard practice of tire manufacturers, but manufacturer must guarantee tire shall not come off when applied to standard S. A. E. wheels. Tires made for artillery wheels shall have the inside circumference of base bands made in accordance with dimensions and tolerance given on Ordnance Department drawings.

To determine the effectiveness of the welding process used pieces of base band metal not less than 8 inches in length will be welded together and turned down to a standard specimen and three such samples containing welds pulled in a testing machine. The total pull required to separate each of the three welds shall be more than 45,000 pounds per square inch of cross section.

In order to determine whether the base bands are being properly welded in production, the inspector may, from time to time, require a weld on the finished tires to be tested in the manner described above. The strength of the welds in production shall be not less than 45,000 pounds per square inch of the section as tested above.

20. PREPARATION FOR SHIPMENT. (a) Painting.—Paint metal bases with rust-resisting paint.

(b) Wrapping.—No wrapping required.

(c) Marking.—Shipping instructions to be shown on printed label pasted

to inside of tire band and with a protective coating of silicate of soda over the label.

PNEUMATIC INNER TUBES (GREY).

Specification No. 1062A.

NOVEMBER 1, 1918.

1. GENERAL. This specification covers the following sizes:

(a) 28 by 3	31 by 4	36 by 6
29 by 3½	33 by 4	36 by 7
30 by 3½	35 by 5	40 by 8
- (b) All tubes manufactured to this specification shall be of the endless type, except motorcycle tubes which shall be butt end or endless as ordered.
- (c) All tubes shall be free from defects and guaranteed as to material and workmanship.
2. COMPOUND. (a) Tubes shall be made from and have the characteristics of a compound containing a minimum of 93 per cent by volume of the best quality new wild or plantation rubber. Sulphur content shall not exceed 7 per cent by weight of new rubber used.
- (b) The organic acetone extract of the cured compound must not exceed 5½ per cent of the weight of new rubber used.
- (c) Compound shall be free from ingredients known to the trade as oil substitutes and/or reclaimed rubber.
3. GAGES. (a) Tubes shall fill the specification in the following table for minimum curing pole size, minimum gages and minimum length.

Size	Minimum Pole Size.	Minimum Thickness.	Minimum Finished Length.
28 by 3	1½ inches	0.072-inch	77 inches
29 by 3½	2¼ inches	0.090-inch	78 inches
30 by 3½	2¼ inches	0.090-inch	81 inches
31 by 4	2¼ inches	0.095-inch	82 inches
33 by 4	2¼ inches	0.110-inch	89 inches
35 by 5	3 inches	0.135-inch	92 inches
36 by 6	3½ inches	0.180-inch	92 inches
38 by 7	4½ inches	0.210-inch	94 inches
40 by 8	5 inches	0.250-inch	96 inches

(b) In case tube is mold-cured, measurements must be equivalent to above as determined by volume. If larger-sized poles are used volume of rubber shall be at least equal to above measurements.

4. SPLICE. The splice shall be as strong as the rest of the tube under the inflation test.

5. VALVES. Each tube shall be fitted with one complete Schrader valve, or its approved equal, applied in such a manner as not to leak or tear out under ordinary usage. The following schedule shall apply:

28 by 3	Schrader's	No. 1936
29 by 3½	Schrader's	No. 1936
30 by 3½	Schrader's	No. 725
31 by 4	Schrader's	No. 725
33 by 4	Schrader's	No. 725
35 by 5	Schrader's	No. 792
36 by 6	Schrader's	No. 2033
38 by 7	Schrader's	No. 2033
40 by 8	Schrader's	No. 2033

Each valve shall be fitted with lock nut, rim nut and valve cap. Dust cap shall be furnished for all valves with the exception of 28 by 3, 29 by 3½, 36 by 6 and over. Spreaders shall be furnished for all sizes up to and including 35 by 5.

6. MARKING. Tubes shall be plainly marked with the manufacturer's name and size of tube, in both inch and the metric equivalent in accordance with S. A. E. standards.

7. TESTS AND INSPECTION. (a) Chemical and physical tests shall be made from each lot of one thousand tubes or less in order to secure deliveries of uniform quality, and in accordance with the requirements of these specifications. These tests and analyses shall be made in accordance with the procedure followed by the Bureau of Standards, Washington, D. C. The average results of four test pieces cut longitudinally from the tube shall show an ultimate elongation of not less than 750 per cent (1 to 8½ inches) when stretched at the rate of 20 inches per minute. The thickness of test pieces shall be the full thickness of the tube, and the central portion of the test pieces shall be ½-inch wide over gage length of one inch, the ends being gradually enlarged to a width of approximately one inch to provide a satisfactory gripping surface. The permanent set determined by the average of four tests with pieces as above, shall not exceed 10 per cent after an elongation of 500 per cent (1 to 6 inches) for 10 minutes followed by a rest of 10 minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(b) Each tube shall be tested for leaks by inflating with air and immersing in water.

(c) The Government reserves the right to make any inspection, test or analysis necessary to insure the product meeting all requirements of the specifications.

8. PACKING. Packing shall be as per specifications accompanying request for bid.

AUTOMOBILE TIRE ACCESSORIES.

Specification No. 1073A.

NOVEMBER 1, 1918.

1. BLOW-OUT PATCHES. These are recommended only for emergency repairs. A vulcanized repair should be made as soon as possible.

Patches must be made of at least six plies of seven-ounce fabric or its equivalent weight of fabric, as approved by the Government. The plies must be properly stepped down, according to good commercial practice. Two cars are required on all patches. The length of the patch must be according to the manufacturers' standard commercial practice. The 3 and 3½-inch must be designed for use with clincher fabric tires and the 4, 4½, and 5-inch must be of ample size for use with cord tires.

2. CEMENTLESS PATCHES. There shall be one standard size, 1½ inches in diameter. The gage and compound of the stock must comply with the specification for cured-back tube stock as given in the repair material specification. Patches molded to a feather edge are preferred.

3. RELINERS. These are recommended only in case of extreme necessity. All sizes up to 4 inches must be made of at least three plies, while 4-inch and larger must be made of at least four plies of seven-ounce fabric, or its equivalent, as approved by the Government. The plies must be built up on the bias and a lap of at least 6 inches is required. The edges

must be properly stepped off on the sides and skived on the ends to insure against injury to the tube. Each size reliner must be designed so that its width will be such as to properly fit the standard tire of that size. This includes 3 and 3½-inch in fabric clincher and 4-inch or larger in cord tires. The edge must stop approximately ½-inch above the toe of the bead.

4. FLAPS. Motorcycle flaps must be of the cemented-in type and equal in construction and quality to the flap supplied by the bidder on tires made to government specifications.

Straight side cord tire flaps must be of the floating type and equal in construction and quality to the flap supplied by the bidder on tires made to government specifications.

5. FABRIC CORD PATCHES. These patches must be made according to the manufacturers' standard practice from carded Egyptian, combed peeler cotton fabric, or their physical equivalent, as approved by the Government, weighing not less than 13 ounces nor more than 16 ounces per square yard. The plies must be laid on the bias, fringed or spread and skim-coated on both sides equally to a minimum gage of 0.043-inch. The compound must fill the specifications set forth in the repair material specifications covering friction, skim, cushion and tube stocks.

All sizes up to six-inch shall be four plies and six-inch and above shall be six plies. The patch must be properly stepped down and preference will be given to gum stripped ends to insure against injury to the tube. There shall be applied in the center of the back of the patch a padding of not less than 1/16-inch thick. The minimum length and breadth of the padding shall not be less than the length of pad specified below.

The following sizes are standard and lengths required are given in table:

3½ and 4-inch patch—length 10 inches.	Length of pad 4 inches.
4½ and 5-inch patch—length 11 inches.	Length of pad 5 inches.
6-inch patch—length 12 inches.	Length of pad 6 inches.
7-inch patch—length 13 inches.	Length of pad 7 inches.
8-inch patch—length 14 inches.	Length of pad 8 inches.

6. VALVE ACCESSORIES. (a) Valves:

Schrader's 1936 or approved equivalent for motorcycle tubes.

Schrader's 725 or approved equivalent for 3½ and 4-inch auto tubes.

Schrader's 792 or approved equivalent for 4½ and 5-inch auto tubes.

Schrader's 2033 or approved equivalent for 6-inch tubes and larger.

(b) Valve caps: Schrader's 880 or approved equivalent.

(c) Valve insides: Schrader's 1801 or approved equivalent.

(d) Tire gage: Schrader's straight Universal gage or approved equivalent for small cars and motorcycles.

Schrader's right-angle gage or approved equivalent for large cars and pneumatic-tired trucks.

(e) Pump connection: Schrader's Universal No. 2238 or approved equivalent.

(f) Deflating caps: Schrader's No. 1886 or approved equivalent.

(g) Valve repair tool: Schrader's No. 2395 or approved equivalent.

The power to approve equivalents is vested only in the Government.

7. REPAIR KITS. Repair kits shall be made up with the following material:—packed in a round cardboard carton with tin ends and cover, approximately 2½ inches in diameter and 2½ inches deep.

It shall contain:—

6 standard cementless patches. Refer to Specification No. 1073A—2.

Strip of cured-back tube gum 2 by 8 inches.

Tube of cement 2½ by ½ inches in diameter or equivalent.

Piece of sandpaper 2 by 8 inches or equivalent.

2 valve insides. Schrader's 1801 or approved equivalent.

2 valve caps. Schrader's 880 or approved equivalent.

Carton to be labeled as follows:

DIRECTIONS

For Temporary Tube Repairs.

For repairing small punctures use "Cementless Patches." Roughen the tube with sandpaper, then apply cement and allow to dry. Remove cloth from patch and apply. Tube can be used at once.

For repairing blow-outs use combination repair stock. Roughen tube around cut with sandpaper, then apply coat of cement around cut inside and outside of tube. Allow to dry. Cut piece combination stock ¼-inch larger in all dimensions than cut and place inside of tube, bringing edges of cut together over center of stock. Apply another coat of cement outside of tube and allow to dry. Cut and place same size piece of combination stock on outside of tube over center of blow-out. Tube can be used immediately.

NOTE: Always remove cloth from patch and combination stock before applying and place cloth side next to tube.

REPAIR MATERIAL FOR PNEUMATIC TIRES.

Specification No. 1067A.

NOVEMBER 1, 1918.

1. FABRICS:—ONLY FOUR TYPES NECESSARY. (a) Square-woven Building Fabric. This fabric shall be 17¼ ounces per square yard with an allowable variation of 3 per cent plus or minus. It shall be 23 by 23 weave. The fabric shall be made from long-staple cotton with a tensile strength for both wrp and filler of at least 150 pounds per inch. Methods of testing to be the same as specified in the fabric casing specifications. The fabric shall be fringed both sides and skim-coated one side to a minimum gage of 0.047-inch.

(b) Cord Builder Fabric. This fabric shall be made from long-staple carded Egyptian or combed peeler cotton, or their physical equivalent as approved by the Government, weighing not less than 13 nor more than 16 ounces per square yard. The cord fabric shall be fringed or spread both sides and skim-coated equally on both sides to a gage of 0.050-inch.

(c) Bead Fabric. Square-woven. This fabric shall weigh at least 8 ounces per square yard. It shall be made from long-staple cotton and shall be fringed both sides.

(d) Breaker Fabric. This breaker shall be an open-weave fabric of at least 10 ounces per square yard. It shall be made from long-staple cotton. It shall be fringed or spread and also skim-coated equally on both sides. The minimum gage shall be 0.070-inch.

2. COMPOUNDS:—ONLY THREE STOCKS NECESSARY. (a) Friction, skim, cushion and tube repair stock. Specific gravity not to be over 1.30. These

shall be made from and have the characteristics of a compound containing at least 65 per cent by volume of new wild or plantation rubber. Compound shall contain no reclaimed rubber. The compound shall be free of ingredients known to the rubber trade as oil substitutes.

(b) Two tread stocks shall be used. There shall be a black stock of specific gravity not over 1.60 and a white or grey stock of specific gravity not over 1.90. The treads shall be made from and have the characteristics of a compound containing at least 50 per cent by volume of best quality new wild or plantation rubber. The kind and quality of the reclaimed rubber must be declared when used. The compound shall be free of ingredients known to the rubber trade as oil substitutes. The tensile strength of a properly cured "tread" sample shall be 2,000 ounces per square inch with a minimum elongation of 400 per cent (2 to 10 inches) as determined by the average of four test pieces when stretched at the rate of 20 inches per minute. The test pieces shall be cut $\frac{1}{4}$ -inch wide over a gage length of two inches, the ends being gradually enlarged to a width of approximately one inch. The permanent set determined by the average of four tests with test pieces as above, shall not exceed 30 per cent after an elongation of 350 per cent (2 to 9 inches) for ten minutes, followed by a rest of ten minutes. All tests shall be made at a temperature between 65 and 90 degrees F.

(c) Sidewall Stocks.—Use tread stock.

(d) Retread Semi-cured Bands.—Use repair tread stock specifications.

(e) Cured-back Tube Stock.—The uncured stocks used must fill the specifications for the friction coat and cushion stocks. The gage of the raw gum shall be not less than 0.015. The gage of the cured gum shall be not less than 0.032.

3. CEMENTS—TWO CEMENTS ONLY. (a) Vulcanizing Cement. This cement shall be made from a compound having a maximum specific gravity of 1.15 containing at least 75 per cent by volume of the best quality new wild or plantation rubber and shall be free from ingredients known to the rubber trade as oil substitutes and/or reclaimed rubber. It shall be dissolved in benzol. The rubber compound content by weight to be determined by evaporation and milled to constant weight, shall be not less than 17 per cent of the total weight of the cement.

(b) Acid Cure Cement. This cement to be made from the best quality new wild or plantation rubber with no other ingredients with a benzol solvent. The pure rubber content weight to be determined by evaporation and milled to a constant weight, shall be not less than 6 per cent of the total weight of the cement. The acid solution used with this cement shall be 2 per cent monochloride of sulphur and 98 per cent benzol.

4. CURE. The base cure on a 4-inch section for repair material should be based on 45 minutes at 50 pounds steam pressure, it being understood that cure is to be made under proper conditions.

5. PRICES. Repair materials will be purchased on a pound basis. For comparison of different quotations the specific gravity and price on the basis of volume must be submitted by the bidder in addition to the price on a weight basis, it being understood that the volume price shall be the price per square yard of the gage specified in the request for bid.

6. VALVE BASIS. Two sizes designated as large and small will be required. The standard commercial, after sample bases have been submitted to and approved by the Government, will be accepted.

7. AIR BAGS. The air bags shall be made according to the standard practice and design of the manufacturer. A sample section of the bag showing the end reinforcement and cross-section of the bag must be submitted to the Government for approval. Bags must be tested with 100 pounds air pressure and show no leaks when immersed in water.

THE FIRST SCREW-FORCING MACHINE.

THE well-known screw-forcing or tubing machine has long been the standard one for forming plastic materials into rods, tubes and an endless variety of other forms in continuous lengths, and may be found in nearly every rubber factory.

The Editor of "The India-Rubber Journal" wrote interestingly (July 7, 1917, page 13) of the introduction of the forcing machine to the rubber industry of Great Britain, remarking as follows:

The first forcing machines made their appearance in the late 'seventies or early 'eighties, and were, we think, the production of a Scotch firm, who had not previously been known as makers of rubber machinery. Some say it was an American invention, but though there are some early American patents referring to it, we do not think it was first made in America.

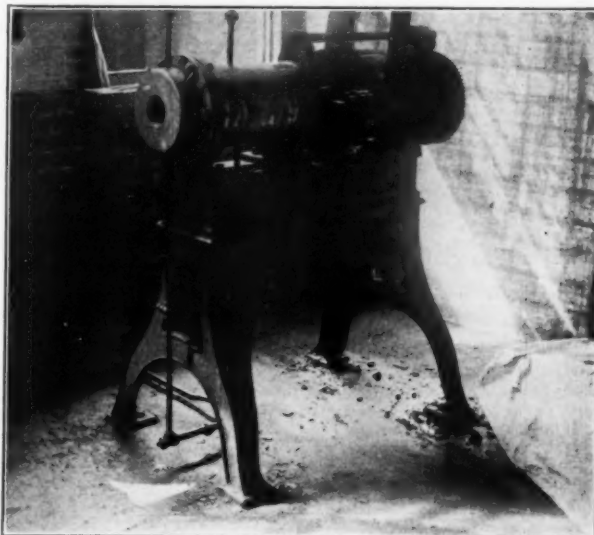
In another issue of the same journal (July 28, 1918, page 8), Mr. R. T. Cooke, for Francis Shaw & Company, Limited, communicated the interesting fact that the first British-made forcing machine was designed and made by the late Francis Shaw in 1878-1879, while in the employ of Messrs. Chas. Macintosh & Company. The editor of the "Journal," however, questions these claims of priority, adding:

On the other hand we have evidence, upon which we based our statement, that the invention was claimed in an altogether different quarter. This point, although small, is interesting, and we shall be glad if any old-time mill managers, or machine makers will give us their views upon it.

In this connection the following remarks, taken from a letter dated October 30, 1917, written to THE INDIA RUBBER WORLD by the late William Kiel, indicate that he designed and introduced the tubing machine for rubber working:

I am pleased to furnish the information that when I was first engaged in the establishment of the Rubber Comb & Jewelry

Co.'s factory¹ in 1876, I had a rod and tubing machine constructed according to my own idea, which machine and duplicates thereof have been in use ever since. Indeed there were many improvements made by machine builders since that date, though the principle of the machine has never changed very materially, but if the Macintosh people had no machine up to 1876, the Rubber Comb & Jewelry Company antedated them by two years.



THE ORIGINAL KIEL TUBING MACHINE.

We are indebted to Mr. W. Weitling, vice-president of the American Hard Rubber Company, for the accompanying illustration of the machine referred to by Mr. Kiel and the information that it is still in use.

¹Located in West Burlington, now Butler, New Jersey. This company was combined with others to form the present American Hard Rubber Co. of which for many years William Kiel was the general superintendent.

UNITED STATES RUBBER CO.'S SCHOOL FOR FOOTWEAR FACTORY EXECUTIVES.

Last spring the United States Rubber Co. inaugurated a school in which to train men selected from its several foot-wear factories for executive positions, this training to comprise, in the main, time study and job analysis. Necessary to success in this field was the use of the slide rule and the intelligent reading of books on the principles of scientific management, and industrial organization.

This class started in New Haven and was shortly moved to Williamsport, Pennsylvania, taking its quarters in the planning department of the Lycoming Rubber Co. In all, about twenty-five students have been sent to the school. Of this number the following will complete the course by Christmas and be returned to their respective factories: G. C. Bauer, Shoe Hardware Co., Waterbury, Connecticut; J. F. Curran, Naugatuck Glove Co., Naugatuck, Connecticut; G. L. Drown, National India Rubber Co., Bristol, Rhode Island; E. J. Artesani, National India Rubber Co., Bristol, Rhode Island; R. J. Ford, Woonsocket Rubber Co., Woonsocket, Rhode Island; H. E. Chittingworth, Candee Rubber Co., New Haven, Connecticut; F. P. Goodwin, American Rubber Co., Cambridge, Massachusetts; C. J. Lahr, Wool Boot Rubber Co., Hastings, Michigan; N. A. E. Nelson, Goodyear Metallic Rubber Shoe Co., Naugatuck, Connecticut; W. C. Robinson, Candee Rubber Co., New Haven, Connecticut; H. A. Curtis, Lycoming Rubber Co., Williamsport, Pennsylvania; R. W. McGregor, United States Rubber Co., New York City.

Beginning January 1 the school will be moved to New Haven, Connecticut, to occupy new quarters now being prepared in offices of the Candee Rubber Co.

Vulcanization Control.

THE interest of every practical rubber worker centers in the process of vulcanization because it is the basic operation on which the value of his output depends. Vulcanization, or the chemical union of sulphur and rubber as made known by Goodyear, Hancock and Parkes in the last century, came under scientific control only within recent years.

The work of the heater-man in charge of the operation of the vulcanizer formerly constituted a very imperfect means of control. The human operator cannot be relied upon, no matter how skilled and conscientious, just because he is human. He forgets, becomes fatigued, has his attention distracted and makes mistakes. It is unnecessary to emphasize the importance of exact control of any manufacturing process, because it is, in fact, axiomatic. Without control uniformity of product is impossible.

IMPORTANCE OF UNIFORM TEMPERATURE AND DRY STEAM.

Mention may be made of certain points which emphasize the value of vulcanization control in eliminating defective product. The effect of too long continuation of the heat of vulcanization is "overcured" or "burned" product resulting in such defects as excess hardness, lack of elasticity and rapid deterioration with age. Too short continuation of the cure leaves the goods "undercured," soft, tacky, or porous, and practically without elastic effect.

Curing in wet steam is undesirable because it results in uneven distribution of heat in the goods, hence irregularity of cure and tendency to undercure. Dry steam circulation in the heater and constant elimination of condensation are essential to uniform heat distribution, either in a boiler or press cure vulcanization.

THE NECESSITY OF GRADUAL INCREASE IN TEMPERATURE.

It is always desirable in vulcanizing rubber goods in large masses, as, for example, thousands of feet of hose on poles or solid tires in molds, to raise the heat gradually over a given period to allow for heating the hose poles or molds to the point where they will not cause loss of heat by condensation, and thus allow the rubber to attain the vulcanizing temperature of the steam. Sometimes this result is obtained by raising the temperature of the heater gradually and sometimes by raising it in a series of steps. The object is to ensure the application of the vulcanization temperature to the goods for a prescribed length of time.

Having determined a suitable plan of conducting the heat progressively, these conditions may be positively reproduced at will by mechanical means. By hand-regulation the rise of heat from stage to stage lacks uniformity and the vulcanizing temperature never remains constant, but fluctuates seriously.

These irregularities have a marked influence on the perfection and uniformity of cure and frequently are the cause of perplexing freak conditions very baffling to eliminate.

AUTOMATIC CONTROL OF VULCANIZATION.

The introduction of automic control of time, temperature and exhaust has made possible perfect vulcanization, a condition vitally essential to a guaranteed product. The development of automatic control of vulcanization has been perfected and extensively adopted in American practice. The system necessitates special instruments and system of piping, but is not subject to disarrangement and is positive and reliable in operation.

STEAM CONTROL.

The principle on which steam control is regulated is the transmission and multiplication of the motion of a capsular spring which expands and contracts with changes in temperature and

consequent change in steam pressure. A ball valve is thus operated, which allows more or less air pressure to open or close a diaphragm-motor steam valve to a greater or less extent. Compressed air affords an instant, flexible and effective means for doing any amount of work required, especially when the steam temperature shows only a slight tendency to change, and when, therefore, the capsular spring moves only an infinitesimal extent.

For the operation of a tire-vulcanizing press a compound controller is frequently used. One of these controllers maintains a uniform steam temperature within the press, while the other takes care of the exhaust at the bottom of the press by periodically relieving the heater of the water of condensation and the super-saturated steam. An automatic time control instrument is set to regulate progressive increase of temperature and the duration of the cure, at which point it promptly shuts off the steam supply and opens the exhaust. It can also be arranged to turn on cold water for flooding and cooling the contents of the vulcanizer.

CHARTING THE CURE.

In the system of vulcanization control is usually included a recording thermometer which produces on a chart a graphic record of just what the controllers have accomplished in maintaining uniform temperature and time and serves as a permanent record. Examination of the charted records shows the perfect exactness with which it is possible to control the time and heat of the vulcanizing operation.

OPPORTUNITIES FOR SOUTH AMERICAN TRADE.

John B. Maus, export manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts, whose portrait appeared in our issue of September 1, 1918, has just returned from a 15,000-mile trip through South America. On the evening of December 17, 1918, he addressed the Chamber of Commerce, Springfield, Massachusetts, on the various aspects of trade in the future with South America. About 100 were present at the meeting.

Mr. Maus emphasized the following needs for successful commercial relations with our sister republics: concentration on the South American market; learning to know the South American people; adequate knowledge of the Spanish language; comprehensive knowledge of geography and familiarity with the financial and business relations of the world; the sending of trained men to South America to study credits and competition; the arrangement by our banks to extend loans to South Americans and establish branches in their country.

Incidentally, Mr. Maus cited the fact that in 1913 British ships cleared the Argentine with 1,843,328 tons of merchandise, while ships flying the American flag cleared only 27,190 tons. He advocated a great merchant marine composed of fast vessels manned by crews under merchantmen's pay, to be picked from our Navy.

THE RUBBER MARKET AT SINGAPORE.

There seems to be considerable doubt as to the effect on the price of rubber by the present weekly Singapore auction sales, which last two days. On the other four days there are private sales between parties meeting in each other's offices. There seems to be a general feeling in favor of the establishment of a rubber exchange, in which sellers could exhibit their samples, and where buyers and sellers could meet for about two hours every morning. The exchange would, at first, only supplement the weekly auctions.

The Vulcanization of Rubber at Constant Temperature and by a Series of Increasing Temperatures.¹

By G. D. Kratz and Arthur H. Flower.

SLIGHTLY CONDENSED, this paper is given as prepared by the authors.

When vulcanization of rubber is effected by heating for a period of time at a definite and constant temperature, the rate of combination of the sulphur with the rubber decreases with the time. In this particular instance we have endeavored to maintain a constant rate of combination of the sulphur and rubber by a variation in the temperature. Our efforts have been confined primarily to devising a method for calculating a series of temperatures by the use of which the rate of vulcanization might be accurately controlled and to make a comparison of the physical characteristics of a rubber mixture vulcanized to the same point by both methods.

The vulcanization of rubber at constant temperature was regarded by Weber² as consisting in a chemical reaction between the rubber and sulphur. Later, Skellon³ also recorded results which tend to show that the combination of sulphur with rubber is strictly a chemical reaction, which is first preceded by the melting of sulphur and its solution in the rubber. Likewise he maintains that the rate of combination for unit time and constant temperature decreases with the decrease in the active mass of the sulphur present. Ostwald,⁴ on the contrary, has regarded the vulcanization phenomena as due to an adsorption of the sulphur by the rubber, the rate of which, when expressed graphically, follows the typical adsorption isotherm. Spence⁵ and his co-workers, however, have demonstrated that Weber's vulcanization curves, on which Ostwald based his calculations, are subject to correction. They⁶ have also shown almost conclusively that the vulcanization phenomenon is the resultant both of an adsorption and a chemical interaction of the sulphur with the rubber, so that the views of others are probably not entirely free from need of modification.

From the results obtained by Spence it is quite obvious that when vulcanization is effected at constant temperature, the major portion of the sulphur combined with the rubber during the early stages of the reaction. Lowering of the initial temperature and subsequently increasing it at regular intervals tends to make the reaction proceed more uniformly.

In fact, for many years it has been common technical practice to employ this method, popularly known as a "rising cure," based mainly upon the fact that it affords a means whereby the low heat conductivity of the rubber may be minimized rather than for the above reason. It is well established that in the case of bulky articles, unless the vulcanizing temperature is exceedingly low, or unless it is initially low and gradually increased as the reaction proceeds, the outside surface may be over-vulcanized before the heat has thoroughly penetrated to the interior of the mass.

There is a distinct and readily measurable relationship between the time required for vulcanization and the temperature at which it is effected, although there is hardly sufficient evidence to warrant its expression as a law. Based on our previous observations we have been able to calculate with accuracy the relative rates of vulcanization for various temperatures and to

apply these different temperatures so that the vulcanization-time curve did actually take the form of a straight line. The satisfactory results obtained were remarkable in that the degree of vulcanization was measured not by chemical but by physical means, which is shown later to be a dangerous procedure.⁷

In the application of the above, however, although the accuracy of our calculations and the control obtained over the rate of combination of the sulphur with the rubber exceeded our expectations, the differences noted in the physical characteristics of a mixture vulcanized by the two methods were not widely different until a sulphur coefficient of 3.9 was obtained. At this point, vulcanization at constant temperature resulted in a product which was noticeably inferior to the same mixture when vulcanized by a series of increasing temperatures.

This was not entirely unexpected, as, in the case of a mixture containing 5 per cent of sulphur, vulcanized to the point of "technical cure"⁸ with a sulphur coefficient of 1.69, the vulcanization-time curve at constant temperature so closely approximated a straight line that, for all practical purposes, a unit amount of sulphur may be said to have combined in unit time by either method. In fact, the same statement may be made with reservation even up to a vulcanization coefficient of 2.9, although at this point both the tensile strength and elongation, particularly the latter, of the mixture vulcanized at constant temperature were found to be slightly inferior to those obtained when vulcanization was effected by a series of increasing temperatures.

Thus, our results would tend to show that the values for the sulphur coefficient, as previously given by others, are in all cases high. Even the figures 2.8 to 3.0, recommended by Spence, appear to be excessive, while the values established by Eaton and Day are entirely out of question. Furthermore, it seems evident, that, as has previously been stated by De Vries, changes in the rubber-sulphur mixture which determine the physical properties of the mixture, proceed independently of those which determine the vulcanization coefficient. Or in other words, the past history of the sample must be known if it is to be judged solely on the basis of its sulphur content.

Likewise, whatever figure may be decided upon as the correct vulcanization coefficient for *Hevea* rubber, it is essential in order to obtain maximum physical results by vulcanization at constant temperature, that restrictions be placed upon the minimum amount of sulphur and catalyst allowable in the original mixture. For best results at constant temperature there should be present in the mixture such quantities of both sulphur and catalyst that the active mass of the sulphur is not decreased to an extent that will slow up the rate of reaction before the desired sulphur content is attained. If this is not taken into consideration the continued heating necessary to effect the com-

¹This work is now being repeated, the rate of vulcanization being measured by both chemical and physical means.

²The term "technical cure" is used to indicate that degree of vulcanization at which are found coincident maximum tensile strength and maximum elongation. This is not necessarily dependent upon the vulcanization coefficient, although a certain relationship does appear to exist between them. "Technical cure" is thus used in contradistinction to "optimum cure," as it has been our experience that what is generally known as "optimum cure" is, in most instances, for practical purposes an over-cure and that the previously established values for the correct vulcanization coefficient are for the most part high. Certainly it should not be in excess of 2.8 per cent. for *Hevea* rubber. In connection with other work we have also determined the vulcanization coefficient of certain rubbers other than *Hevea*. These results show that although the coefficients for these rubbers are not necessarily constants, as suggested by Spence and Eaton, they should not be in excess of the following figures: Plantation *Hevea*, 2.8; Fine Hard Pará, 3.2; Red Kassai, 3.4; and Ceara (Manihot), 4.4. Samples of these rubbers with high coefficients were found to age quickly with rapid deterioration.

³Presented before the Rubber Section at the 56th meeting of the American Chemical Society, Cleveland, September 10 to 13, 1918.

⁴"Chemistry of India Rubber," 1906 edition, pp. 85-88.

⁵"India Rubber Journal," 46 (1913), 723; "Rubber Industry," 1914.

⁶"Kolloid-Zeitschrift," 6 (1910), 136.

⁷"Kolloid-Zeitschrift," 11 (1912), 28; "Chemiker-Zeitung," 36 (1912), 1162; "Kolloid-Zeitschrift," 11 (1912), 274.

⁸*Ibid.*, 8 (1911), 304; 11 (1912), 28; 13 (1913), 265.

bination of the latter fractions of the sulphur undoubtedly impairs the quality of the final product.

Under certain conditions we have found it possible to obtain a uniform rate of vulcanization for a rubber-sulphur mixture by employing a previously calculated series of increasing temperatures such that the vulcanization-time curve is reduced to a straight line.

By so doing we have shown that at comparatively high sulphur coefficients a better product is obtained by vulcanization with a series of increasing temperatures than with a constant temperature. We have also found the vulcanization coefficients previously recommended by others to be excessive, and that, unless the history of the vulcanization phenomenon is fully known, it is unsafe to judge samples solely on the basis of their sulphur content.

The mixture used by the authors in their experiments consisted of the following proportions by weight:

First latex plantation cr��pe.....	100
Zinc oxide	100
Sulphur	5
Basic amine	0.33

The rubber used was the best quality typical of its variety and was subjected to the minimum amount of milling necessary to work in all of the ingredients. The basic amine (catalyst) was ground to 200-mesh and was worked into the rubber before the pigment and sulphur were added.

An investigation was made of the rate of vulcanization of this mixture at a constant temperature of 298 degrees F. Our results, which confirm those previously obtained by others, are tabulated in Table I and are expressed graphically in Figure 1. By this table and figure it is also shown that although 60 per cent of the sulphur present in the mixture combined with the rubber during the first two hours, less than 80 per cent had entered into combination at the end of 4 hours.

TABLE I.—VULCANIZATION AT A CONSTANT TEMPERATURE OF 298 DEGREES F.				
Time of Vulcanization, Min.	Combined Sulphur, Per cent.	Tensile Strength, Lbs. per Sq. In.	Elongation, Per cent.	Permanent Set, Per cent.
10	0.404	...	...	...
15	0.578	...	...	...
20	0.663	...	...	...
25	0.840	...	...	...
30	1.080	1527	725	14.32
40	1.330	1533	710	14.06
50	1.490	1930	707	15.23
60	1.690	2277	697	15.62
70	1.875	2015	685	17.97
80	2.170	2102	690	20.30
90	2.485	2055	680	21.09
120	2.945	2156	678	24.22
150	3.410	2060	685	25.78
180	3.600	1725	677	23.44
210	3.780	1558	680	23.44
240	3.920	1435	652	18.75

It is seen in Table I that the "technical cure" for this mixture is obtained in about 60 minutes at 298 degrees F. with a vulcanization coefficient of 1.69. Further, while the general

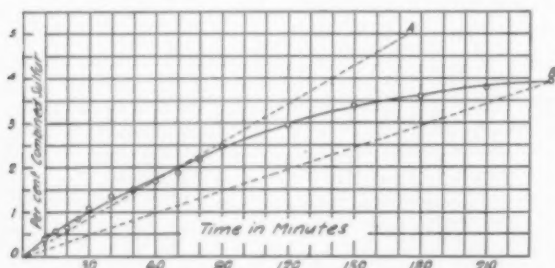


FIGURE 1.—VULCANIZATION-TIME CURVE AT CONSTANT TEMPERATURES.

shape of the curve in Figure 1 was found to be convex to the x -axis, that portion up to and including this 60-minute point very closely approximates the straight line OA, drawn through this point. Thus in the case of this particular mixture "technical

vulcanization" is attained before the active mass of the sulphur present is decreased to an extent which would produce a marked decrease in the rate of vulcanization.

It has been shown above that at a coefficient of 1.69 our method was not applicable for the differentiation of the small variations in the quality of the mixture, due to the method of vulcanization employed. For this reason a comparison was made of the physical characteristics of the mixture when vulcanized to a coefficient of 3.9 at constant temperature and by a series of increasing temperatures.

The temperatures and times to be employed to effect vulcanization by the latter method may be readily obtained by applying the data given in Table I and Figures 1 and 1a. First, the number of different temperatures to be used should be previously decided upon. Second, the number of minutes required to effect a "technical cure" at each of these temperatures may be obtained from Figure 1a. Then, treating each temperature in the series individually, let

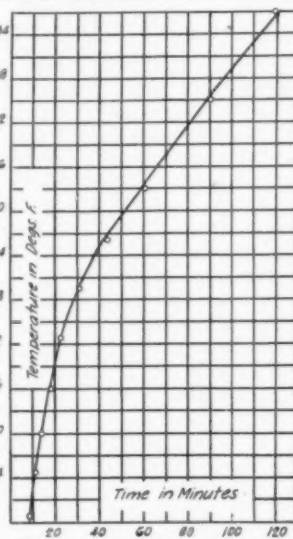


FIGURE 1a.—TEMPERATURE-TIME CURVE FOR VULCANIZATION TO TECHNICAL CURE.

t = time in minutes required to effect a "technical cure" at that temperature. (From Figure 1a.)

t' = time in minutes required to effect a "technical cure" at 298 degrees F. (From Table I.)

c = time in minutes required to attain the desired vulcanization coefficient at 298 degrees F. (From Table I.)

n = number of temperatures in the series.

$$t \times \frac{c}{t'}$$

Then, $\frac{n}{\text{Total}} = T$, where T equals the number of minutes required for vulcanization at a given temperature when employed in the previously established series.

It is quite obvious that, if temperatures are chosen at random from the figure, the sum of the times for the complete series of temperatures may not be the same as the time required to effect the desired degree of vulcanization at a constant temperature of 298 degrees F. On the other hand, it is easily possible to make a selection such that the total time of vulcanization is the same by either method. In order that our results might be strictly comparable, we chose the following series of four temperatures, the sum of the times of which was exactly equal to 240 minutes, the time required to obtain a coefficient of 3.9 at 298 degrees F.

285.5 degrees F. for.....	107 minutes
298.0 degrees F. for.....	60 minutes
302.5 degrees F. for.....	43 minutes
307.0 degrees F. for.....	30 minutes
Total	240 minutes

Employing the foregoing series of temperatures and times, the mixture was vulcanized in a button mold for a total time of 240 minutes, samples being removed for combined sulphur estimation at hourly intervals and at each change in the vulcanizing temperature. These results are shown in the first four columns of Table II and expressed graphically by the solid line in Figure 2. It is readily observed that the results obtained coincide al-

most exactly with the hypothetical straight vulcanization-time curve represented by the dotted line O B in Figures 1 and 2.

Separate slab cures were then made for physical tests, at the temperatures and times required to produce vulcanization co-

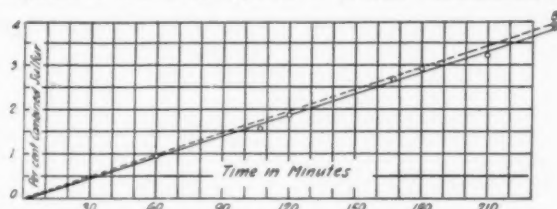


FIGURE 2.—VULCANIZATION-TIME CURVE FOR INCREASING TEMPERATURES.

efficients of 1.56, 2.96, and 3.86. The results of these tests are shown in the last three columns of Table II.

TABLE II.—VULCANIZATION BY A SERIES OF INCREASING TEMPERATURES.

Total Time at the Time of Vulcanization, Min.	Difference in Temps., Min.	Temperature, Deg. F.	Combined Sulphur, Per cent.	Tensile Strength, Lbs. per Sq. In.	Elongation, Per cent.	Permanent Set, Per cent.
60	60	285.5	0.937			
107	107	285.5	1.567	2168	715	17.97
	107	285.5				
120	13	298.0	1.879	....	....	....
	107	285.5				
167	60	298.0	2.702	....	....	....
	107	285.5				
180	60	298.0	2.963	2234	714	25.52
	13	302.5				
	107	285.5				
210	60	298.0	3.252	....	....	.. ..
	43	302.5				
	107	285.5				
240	60	298.0	3.862	1944	705	25.00
	43	302.5				
	30	307.0				

To facilitate comparison, the results of these physical tests, together with those obtained at the same sulphur coefficient when vulcanization was effected at a constant temperature of 298 degrees F., have been grouped together in Table III. From this table it is seen that there is very little difference in the tensile strength of the mixture at coefficients of 1.69 or 2.94 when vulcanized by either method. But in both instances, a series of increasing temperatures appears to produce a product of superior elongation. When the coefficient is increased to 3.9, however, it is seen that the product obtained by employing a series of increasing temperatures is markedly superior to that obtained at constant temperature, both as to tensile strength and percentage of elongation.

TABLE III.

Combined Sulphur,		Tensile Strength,		Elongation	
Constant Temp.	Increasing Temp.	Lbs. per Sq. In.	Constant Temp.	Increasing Temp.	Constant Temp.
1.699	1.567	2277	2168	697	715
2.945	2.963	2156	2234	678	714
3.920	3.860	1435	1944	652	705

It is recognized that the results which have been recorded herein are not subject to indiscriminate or general application.

This work has been confined to the investigation of one rubber-sulphur mixture only, and our calculations have been based on the correct or "technical cure" of the mixture as being obtained after vulcanization for 60 minutes at 298 degrees F. However, as the comparisons made are relative, and as the principle involved will apply to other mixtures and other vulcanization coefficients, we are warranted in drawing the following conclusions:

1—That it is possible to calculate and apply a series of increasing temperatures such that the vulcanization-time curve for any rubber-sulphur mixture may be made a straight line, the slope of which is dependent on the temperatures employed and the amount of catalyst present.

2—That in vulcanization at a constant temperature, in order to procure maximum physical properties, sulphur must be present in the mixture in such an amount that its active mass is not decreased to an extent which will appreciably slow up the rate of reaction before the desired vulcanization coefficient is attained.

3—That for rubber-sulphur mixtures containing 5 per cent or less of total sulphur, the physical properties of the mixture, when vulcanized by a series of increasing temperatures, are superior to those obtained by vulcanization at constant temperature; this is particularly true at vulcanization coefficients of 2.8 or above.

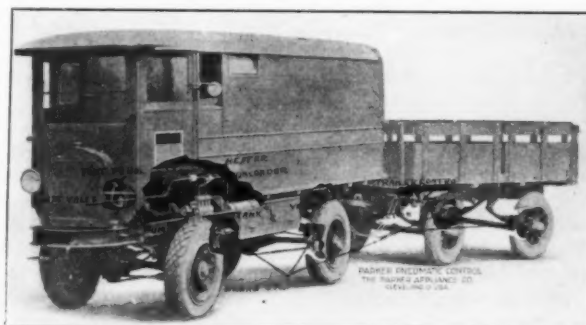
4—That the vulcanization coefficient for *Hevea* rubber is probably between 1.7 and 2.8.

5—That it is dangerous to evaluate samples of vulcanized rubber solely on the basis of their vulcanization coefficients.

AIR BRAKES FOR MOTOR TRUCKS AND TRAILERS.

The use of motor-truck trailers has been limited to light loads and fairly level roads, due to the impossibility of controlling heavily loaded trailers with ordinary brakes. With the application of specially designed air-brake equipment this difficulty disappears and the motor truck and trailer become successful factors in the transportation of interurban freight. This opens a new field of business for the manufacturers of air-brake hose and one that presents an assured future.

A two-ton truck and a five-ton trailer with a seven-ton load afforded an exceptional test in a recent trial run where 250



TRUCK AND TRAILER EQUIPPED WITH AIR-BRAKES.

miles of mountains were encountered with grades as stiff as 19 per cent, and four miles long. The fact that the train was held under control under all conditions without damaging the brake linings, speaks well for the brake equipment. For exceptionally severe service, as in construction work, the use of armored hose is contemplated.

With this equipment the use of pneumatic tires is more appealing to the truck owner, as there is always a reliable means of inflation at hand, and as the pneumatic tire gains prestige in the trucking field, air brakes should be the standard equipment on all trucks, whether a trailer is to be used or not. (The Parker Appliance Co., 2619 Vermont avenue, N. W., Cleveland, Ohio.)

NO RUBBER STANDARD AT SINGAPORE.

In Singapore there is no official rubber standard, and each person uses the description that he considers most apt. The Singapore unofficial standard of sheet, called "prime," is higher than the London official standard of sheet, called "f. a. q.," and rubber that would be thrown out in Singapore as not coming up to the level of "prime sheet," might often pass the London "f. a. q." standard. On the other hand, rubber with the marks of a well-known "crack" rubber estate might fetch a premium of a half-penny or so in London over the price for standard quality. That rubber would be "prime" in Singapore.

What the Rubber Chemists Are Doing.

INVESTIGATIONS OF THE VULCANIZATION PROCESS.¹

DR. A. W. VAN ROSSEM, Director of the Institute of the International Association for Rubber Cultivation in the Netherland Indies, has compiled the Institute studies of the influence of various factors on the vulcanization process. The studies here reported were restricted to the treatment of hot vulcanization only. Following brief introductory remarks on the well-known objects and results of the vulcanization process, the influence of various important factors are considered. The results obtained are given below in condensed form.

INFLUENCE OF THE METHOD OF PLASTICIZING AND WASHING ON THE VULCANIZATION COEFFICIENT.

There is no doubt that very intense plasticizing can be carried out without having any influence on the velocity of vulcanizing, as appears from results expressed in terms of the vulcanization coefficient of a mixture of 92½ parts *Hevea* crêpe and 7½ parts sulphur, cured according to the standard method. (THE INDIA RUBBER WORLD, September 1, 1918, page 723.)

INFLUENCE OF PLASTICIZING ON RELATIVE VISCOSITY AND VELOCITY OF VULCANIZATION.

Way of Plasticizing	Relative Viscosity 5% Solution in Benzine of Plas- ticized Mixture.	Vulcanization Coefficient.
Normal	177	2.25
10 times extra	123	2.29
30 times extra	85	2.28
60 times extra	63	2.28

The marked decrease of viscosity shown in the table is notable. This decrease takes place at a slower rate when the manipulation is carried out without rest. In this case the period of rest was short and had little influence. If the rubber is allowed to cool, as over night, it is much more affected when milled again. Probably on much longer plasticizing a greater decline of viscosity will take place.

Whereas, Weber², and Spence and Ward³ find that the velocity of vulcanization is independent of the duration of plasticizing, Axelrod⁴ finds that strongly plasticized rubber takes up more sulphur than the normally treated. No indication of this fact with very strongly plasticized rubbers was found at the Institute.

There is no doubt that on the washing rolls rubber is depolymerized in a way corresponding to that on the mixing rolls but also there may be removed by washing substances which affect the velocity of vulcanization. This has been proved with certainty by the Institute for Pará rubbers and also for special rubbers prepared according to evaporation processes.

TIME OF CURE AND THE VULCANIZATION COEFFICIENT.

It appears that the quantity of combined sulphur increases about in proportion to the duration of the vulcanizing time.

TEMPERATURE AND THE VULCANIZING COEFFICIENT.

From the tabulated results of three series of experiments on the same rubber and sulphur mixing it is deduced that the temperature coefficient for an interval of nine degrees C. is greater than two. With ten degrees difference of temperature the results diverge more, and with six degrees difference, have a greater tendency to similarity. Consequently it may be safely assumed that for temperatures not varying much from the technical ones, van't Hoff's rule will prevail, namely, that the temperature coefficient is between two and three. Whether this

holds for temperatures below 100 and above 160 degrees C. remains to be investigated.

ADDED SULPHUR AND THE VULCANIZATION COEFFICIENT.

This matter was studied on mixes of rubber and sulphur ranging from 2½ to 20 per cent of sulphur, vulcanized at 50 pounds of steam for 1½ hours. The results show that there is a direct relation between the coefficient of vulcanization and the sulphur present.

VISCOSITY OF RAW RUBBER AND THE COEFFICIENT OF VULCANIZATION.

There exists for first latex rubbers a close correlation between the viscosity of the raw product and the velocity of vulcanization. This correlation is striking because the rubber has been strongly depolymerized before devulcanization, even with the normal way of working. All first latex rubbers will probably be depolymerized on prolonged plasticizing to an identical degree of viscosity. In practice a highly viscous rubber will be less depolymerized before vulcanization than a less viscous one. The above-mentioned correlation, however, does not become less striking in consequence, for it has been seen above that the velocity of vulcanization is independent of the amount of plasticizing. It is very probable, in view of experimental results, that rubber low in viscosity vulcanizes much more slowly than highly viscous rubber.

In order to throw light on the influences which dominate the process of transforming pure raw rubber into the cured product the following points were investigated: (1) Is increase of breaking load attributable to less depolymerization of the rubber before vulcanization? (2) Is increase of breaking load due to the specific property of building up more quickly while being vulcanized in the case of a rubber of higher viscosity number?

Experimentally it was found that a test piece made from a brand of rubber whose solution shows a high viscosity number, becomes stronger than one made from a species which gives a less viscous solution, because the inherent properties of the first cause it to vulcanize with greater rapidity. Under normal circumstances such a test piece becomes still stronger, because the highly viscous rubber is far less depolymerized during the same amount of work exerted upon it by the mixing rolls than a rubber which is less viscous.

INFLUENCE OF THE PERCENTAGE OF RESIN, ASH, NITROGEN AND THE DEGREE OF ACIDITY ON THE VULCANIZATION COEFFICIENT.

Opinions are divided as to whether the presence of resin is an advantage to vulcanization of rubber or not. The work of the Institute, by Van Heurn, indicates, without restriction, that with standard vulcanization the influence of resin on the mechanical properties of rubber is to lower the breaking strength.

Later, on elaborating numerous data, Van Rossem found the peculiarity of first latex rubbers, that there exists a correlation between the percentage of resin and the velocity of vulcanization and that with the increase of the resin percentage, velocity increases on the average. Though the correlation coefficient has a comparatively low value, still there is a distinctly positive correlation between the percentage of resin and the vulcanization coefficient. That this correlation exists is especially remarkable because from Van Heurn's tests just mentioned, it appeared that the addition of rubber resins causes the breaking strength to decline and elongation at break to increase.

The way the resins can affect the mechanical properties of rubber was revealed by a study of elongation diagrams and led to the following conclusions:

1. By extracting the resin a change in mechanical properties

¹Communications of the Netherland Government Institute for advising the Rubber Trade and the Rubber Industry.—Part VI.

²"The Chemistry of India Rubber," 1902, page 16.

³"Kolloid-Zeitschrift," 11, 1912, page 278.

⁴"Gummi-Zeitung," 24, 1909, page 352.

takes place requiring more strain to produce the same elongation, because the rubber gains in stiffness.

2. After adding the extracted resin the original diagram of elongation is recovered except that the curve does not extend quite as far.

3. Addition of double the quantity of resin produces a greater elongation for the same stress, the rubber thus having become more "supple."

It should not be lost sight of that the contradiction between the above-mentioned positive correlation and the influence of resins may be apparent, no corresponding vulcanization coefficients having been determined. It is possible that the resins have an accelerating influence on the binding of sulphur, or they may cause a marked decline of the mechanical properties.

It should further be noted that by "percentage of resin" is denoted the acetone extract, and that these terms are not identical, as the acetone extract also contains non-resinous or nitrogenous compounds. Possibly some of the ingredients of this acetone extract have an accelerating effect and it may be because of this that the correlation between velocity of vulcanization and percentage of resin is not more distinct.

From the data for 214 samples of first latex crêpe Van Rossem found that there exists in general no correlation between the percentage of ash in the raw rubber and the velocity of vulcanization.

From 134 samples he determined that there exists no correlation between the nitrogen percentage of the raw rubber and the vulcanization coefficient.

In this respect Clayton Beadle and Stevens have shown that the insoluble part, rich in nitrogen, accelerates vulcanization, and Stevens found that different nitrogenous compounds, such as peptone and casein, act in the same way. These tests retain their value, but, according to the preceding, the more or less accelerating action of the so-called insoluble part may no longer be attributed to the nitrogen percentage. This does not mean that artificially added nitrogenous compounds may not act on the velocity of vulcanization, nor should it prevent other natural ingredients in the raw rubber from acting in a similar way.

No correlation exists between the degree of acidity of the rubber and the velocity of vulcanization. This is somewhat surprising, since acid acts to retard the velocity. In the meantime it should be remembered that the degree of acidity can be only incompletely determined.

FILLERS AND ACCELERATORS AND THE VULCANIZATION COEFFICIENT.

The addition of not too large quantities of inorganic fillers which are inactive in respect to sulphur, does not practically change the velocity of vulcanization.

Whether an inorganic or an organic material will act as an inert filler or as a catalyst in the vulcanization process is uncertain of prediction. The action of old ground rubber, reclaimed rubber and rubber substitutes is a study of great importance, but this for the present is prevented by a number of difficulties.

(To be continued.)

METHODS OF ANALYSIS.

DETERMINATION OF FREE CARBON IN RUBBER GOODS.

A. H. SMITH and S. W. Epstein, of the Bureau of Standards, read before the Rubber Section of the American Chemical Society at Cleveland, September 10 to 13, 1918, a paper on the determination of free carbon in rubber goods. Following is an abstract of their investigations and conclusions and their method of analysis in full:

The authors state that the main object in the determination of free carbon in rubber goods is to permit the determination of the rubber content by difference. The most widely used method for the determination of rubber is to calculate it as the difference between 100 per cent and the sum of ash, total sulphur, and various extracts. This method is subject to wide

error when free carbon is present and no allowance is made for it.

The nitric acid methods of Henry William Jones¹ and of W. A. Caspari² were not found entirely satisfactory. The authors have found that the action of nitric acid is to attack the carbon of lampblack and gas black and it is necessary to correct the analytic results as obtained by ignition loss to compensate for the error caused by the formation of compounds from the free carbon. The attack of amorphous carbon by nitric acid renders an accurate determination by this method impossible, but the error is sufficiently uniform and small to allow practical determinations.

DETAILS OF METHOD AS FINALLY ADOPTED.

Extract a one-gram sample for six hours with acetone and then for three hours with chloroform or carbon bisulphide. Transfer the sample to a 250 cc. beaker and heat on the steam bath until it no longer smells of chloroform. Add a few cc. of hot concentrated nitric acid and allow to stand in the cold for about 10 minutes. Add 50 cc. more of hot concentrated nitric acid, taking care to wash down the sides of the beaker. Heat on the steam bath for about one hour or until the disappearance of all bubbles or foam from the surface. Pour the liquid, while hot, into a Gooch crucible containing a fairly thick pad of ignited asbestos. Filter by applying gentle suction and wash well with hot concentrated nitric acid. Empty the filter flask, wash the filter alternately with acetone and benzol until the filtrate is colorless. Next wash it well with a hot 15 per cent solution of sodium hydroxide. Test for the presence of lead by running some warm ammonium acetate solution, containing an excess of ammonium hydroxide, through the pad into a solution of sodium chromate. If a yellow precipitate forms, the pad must be washed with the ammonium acetate solution until the washings no longer precipitate the sodium chromate solution. Next wash the residue well with warm five per cent hydrochloric acid solution. Remove the crucible from the funnel, taking care that the outside is clean, and dry it in an air bath for 1½ hours at 150 degrees C. Weigh, burn off the carbon at a dull red heat, and reweigh. The difference in weight represents approximately 105 per cent of the carbon originally present in the form of lampblack or gas black.

It is recommended that 0.5-gram samples be taken for compounds containing over ten per cent of free carbon and one-gram samples be taken for compounds containing less than this amount.

AUTHORS' REMARKS ON METHOD.

The factor of 105 per cent as a ratio between the ignition loss and the amount of carbon present was arrived at from the results of a large number of determinations made at the Bureau of Standards. Gas black determinations ran from 101 to 106 per cent and lampblack determinations from 100 to 108 per cent. Results were obtained on different samples containing large amounts of mineral rubber, lead (both in the form of oxide and sulphate), reclaimed rubber of various kinds, glue, substitute, sulphides of antimony, talc, etc. In all cases the results came between 101 and 108 per cent of the carbon originally present. By using the factor of 105 per cent, the maximum divergence is four per cent and the usual divergence very small.

In our analysis of the gas black and lampblack used in our experiments, we determined the volatile loss at 100 degrees C., the acetone extractable matter, and the ash, and assumed the remainder of our samples to be carbon. Our results have been calculated to this basis, and justify the method for routine laboratory use.

¹ Fourth International Rubber Congress.
² "India Rubber Laboratory Practice."

Replete with information for rubber manufacturers—Mr. Pearson's "Crude Rubber and Compounding Ingredients."

CHEMICAL PATENTS. THE UNITED STATES.

LIQUID COATING COMPOSITION.—A liquid coating composition comprising linseed oil, rosin, gutta percha, gum arabic, shellac and gasoline in prescribed proportions. (Frank Picard, Fall River, Mass. United States patent No. 1,281,650.)

CATALYST.—As a new catalyst for hardening oils, finely divided poreless native amorphous silica of the character of that occurring in asbestos deposits, such silica being of a fineness as high as 400-mesh and carrying reduced nickel. (Alexander Schwarzman, assignor to Kellogg Products, Inc., both of Buffalo, N. Y. United States patent No. 1,282,297.)

RUBBER COMPOSITION AND METHOD.—Vulcanized compositions and products of light color, which comprises incorporating with a vulcanizable ingredient of the composition to be vulcanized, a light-colored semi-solid to solid bitumen, obtainable by the destructive distillation of coal-tar pitch, and subjecting the composition to vulcanization. (John M. Weiss, assignor to The Barrett Co., both of New York City. United States patent No. 1,282,505.)

GERMANY.

REGENERATING OF VULCANIZED RUBBER.—The regeneration of soft vulcanized rubber is effected as follows: Vulcanized rubber is heated to a high temperature, without melting, in a vacuum or in an inert gas, and the harmful effect of the air on heated rubber is avoided by rapid cooling; for example, by treatment with cold water, or solutions of sodium carbonate or alkali. (B. J. F. Varenhorst, The Hague, and J. G. Fol, Dell, Netherland Indies. German patent No. 302,995, March 19, 1914.)

THE DOMINION OF CANADA.

PROCESS OF MAKING RUBBER SPONGES.—A process for producing an antimony-colored rubber sponge of low specific gravity comprising a batch of material including chiefly rubber, to which is added a softening agent, sulphuret of antimony, a rubber substitute and a softening medium containing a blowing agent acting late in the period of vulcanization, and a softening medium acting when cold to stiffen the mass and having substantially no retarding effect upon the reformation of the mass during vulcanization. With this mass is mixed a body-forming medium of low specific gravity, the main blowing agent and an ingredient for retarding the blowing action in the first stages of vulcanization. This mixing is worked until it reaches the consistency of soft putty and after aging is formed into the desired shape and vulcanized. The cured article is mechanically compressed to break its unbroken cell walls, and finished by trimming off the skin, exposing the porous body. (The Miller Rubber Co., assignee of Richard Griffith and Charles F. Flemming—all of Akron, Ohio, U. S. A. Canadian patent No. 186,291.)

THE UNITED KINGDOM.

LEATHER SUBSTITUTES.—A coarse felt impregnated and covered with a mixture of leather powder, vulcanized rubber powder, and free sulphur heated to a semi-liquid state, with which may be incorporated rosin, sodium silicate, and coloring matter. After mixing and heating, the material is forced in semi-liquid condition into the open pores and coated on the surface of coarse felt and cooled until solid. (J. Ward, 31 Gratton Road, Queen's Park, Bedford, England. British patent No. 119,304.)

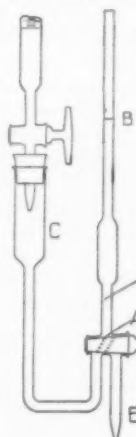
TIRE PUNCTURE COMPOSITION.—A composition for sealing pneumatic tires, etc., consisting of the following ingredients, the preferred proportions being as stated, namely: water, two quarts; granulated cork, four ounces; powdered cork, two ounces; talc, one pound; white lead, eight ounces, and gum arabic, two ounces. (W. P. Thompson, 6 Lord street, Liverpool, England. [Puncture Cure, Limited, 19 Union Bank Building, Calgary, Canada.] British patent No. 119,324.)

LABORATORY APPARATUS.

BURETTE-CALIBRATING PIPETTE.

A SPECIAL burette-calibrating pipette has been perfected by C. W. Foulk, of the Department of Chemistry, Ohio State University, Columbus, Ohio, and interestingly described by him in a reprint from an article originally published in the "Journal of Industrial and Engineering Chemistry,"

August, 1915, page 689. The illustration shows the pipette attached to the outlet of a burette to be calibrated. All previously described burettes of this sort have had a mark on the lower stem which served as a zero point. In the present instance it is evident, as the accompanying figure will illustrate, that if the pipette has previously filled and emptied, the flow will begin at the top of the boring through the plug of the cock at A. Thus the point A is a zero mark to which the adjustment of liquid is automatically regulated by the position of the cock. This zero point is more accurate than a mark around the lower stem would be on account of the boring. (The Kauffman-Lattimer Company, Columbus, Ohio.)



BURETTE-CALIBRATING
PIPETTE.

A NEW COMBUSTION BULB.

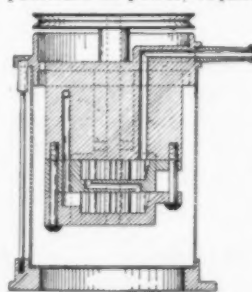
A very convenient and easily cleaned combustion bulb is here shown. It is extremely simple in construction and has no stop-cocks to work loose and leak, or stick tight and cause breakage by attempted removal. It weighs about 125 grams when fully charged and has a demonstrated capacity of absorbing up to four grams of carbon dioxide without loss when the gas current is flowing at the rate of 500 c.c. per minute. (The Kauffman-Lattimer Co., Columbus, Ohio.)



COMBUSTION
BULB.

HIGH VACUUM PUMP.

The most recent development in high vacuum pumps for laboratory and commercial purposes is represented by the Cenco-Nelson pumps. They are compact, operate with very small expenditure of power, require no attention when in operation and



HIGH VACUUM PUMP.

last indefinitely. They measure about seven inches high by five inches in diameter at the base and weigh about ten pounds. The two-stage pump contains two pairs of gears, arranged one above the other. The upper pair takes the air from the inlet tube and delivers it to the lower pair, which forces it out through the exhaust. The three-stage contains three pairs of gears similarly arranged and produces a higher vacuum. To offset the heating effect in operation a water circulation system is provided. (Central Scientific Co., 460 East Ohio street, Chicago, Illinois.)

BARIO.

Bario metal is a successful substitute for platinum for laboratory crucibles and other utensils. Bario is a brilliant grayish-white, non-magnetic metal, melting at 3100 degrees F. and upwards, according to grade. It is not attacked by nitric, sulphuric, hydrochloric, hydrofluoric, acetic or oxalic acids, nor by alkalis, sea water, ammonia, iodine, etc. (The Bario Metal Corp., 167 West 18th street, New York City.)

New Machinery and Appliances.

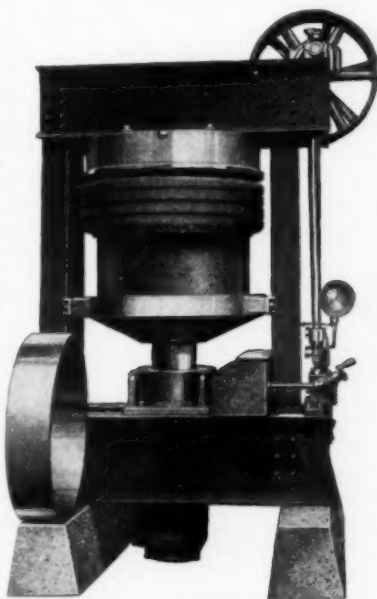
THE W-S-M HYDRAULIC SOLID-TIRE PRESS.

A NECESSARY part of the equipment of truck service stations and garages is a solid-tire applying press. Speed, simplicity and strength should be the prominent characteristics of this machine that must be always ready and efficient and require but little mechanical knowledge in the operation of mounting and demounting tires.

Such specifications are embodied in the press shown in the accompanying illustration. It operates by hydraulic pressure and is built in two sizes with 150 and 200-ton pressure ratings. The frame construction and strength of the fittings are amply able to take care of the occasional serious overloads that are demanded in service.

To mount a tire the ram is lowered, the wheel is placed on lower platen, with the tire in position above it. The belt is thrown onto tight pulley, and the control valve closed.

To demount the tire a ring is placed on the lower platen, just large enough to clear wheel, which is placed upon it. A second ring, or a set of blocks as is sometimes used, is placed on the circumference of tire. The control valve is then closed, and the tire pressed down off of wheel. (The Wellman-Seaver-Morgan Co., Akron, Ohio.)



MOUNTING TIRE—BEGINNING OF STROKE.

TWO-DIP SPREADER FOR CORD FABRIC.

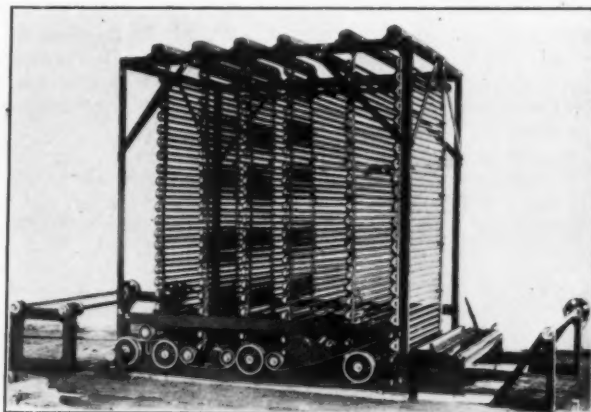
This machine is particularly designed for coating cord fabric, providing two coats with a short drying operation between the two immersions and a somewhat longer and more thorough process after the second coat.

The let-off for handling the fabric is carried on a separate stand on the feed end of the machine, delivering the fabric to the machine under a light tension. The fabric passes through the first tank and receives a heavy coat of cement, the excess being removed by a scraper bar, and the pressure being regulated by a spring. The fabric is then carried over two vertical steam-coils and partially dried before being delivered to the second tank, at which point it is given an additional coat. It is then thoroughly dried over a bank of four vertical steam-coils and delivered to an external wind-up stand which also carries a friction let-off for the liner.

The fabric in passing through the machine is driven by six rolls carried on the bottom framework on plain bearings and driven by an endless belt. Idler rolls are provided over each drying section and are mounted on ball bearings, the first four rolls being of the spreader type, insuring a smooth finish.

Drying coils, tanks, driving and idler rolls are all mounted on an angle-iron frame which is rigidly braced and supported.

This framework is enclosed except for a short distance above the floor line by a sheet-metal cover, the driving side of which consists of removable doors. The side section includes a con-



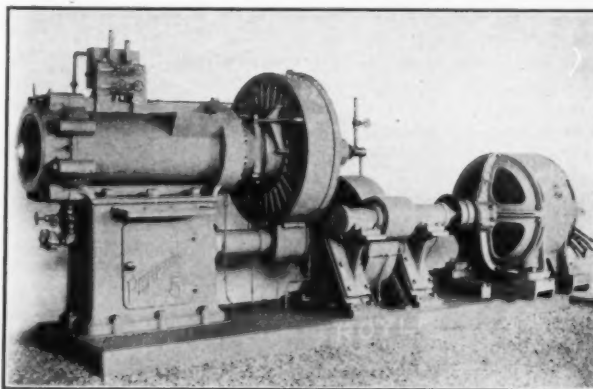
A CORD-FABRIC SPREADER AND DRYER.

nection for an exhaust fan to assist in removing the vapor.

Due to the inflammable nature of the cement and vapors, it is usual to provide a separate building isolated from the main plant. For this reason the machine has been designed for countershaft drive so that the cement churns and exhaust fan may be driven from the same motor. (The Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.)

THE LARGEST TUBING MACHINE.

Tubing machines are invaluable in making a great variety of rubber products that range from the smallest rod to the largest solid tire. That the mechanical development of these machines has kept pace with the manufacturing demands is shown by the accompanying illustration of the largest tubing machine. It is interesting to compare this 1918 product with the



THE ROYLE PERFECTED TUBING MACHINE

original Kiel tubing machine, built in 1876, and shown elsewhere in this issue.

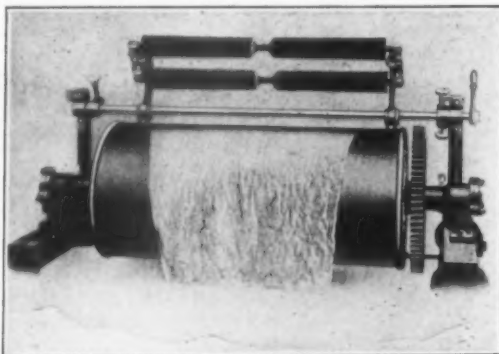
The Royle perfected tubing machine was built for making solid tires and has a cylinder bore of 9 inches. The die limits are 3 to 6 inches. Extra large dies of 8¾ inches may be used. The machine weighs 18,000 pounds and occupies a floor space

of 48 by 158 inches. It is driven by a 100-horse-power motor and reduction gear. (John Royle & Sons, Paterson New Jersey.)

THE BRUSH CLOTH STRETCHER.

Many kinds of fabrics are used in making certain rubber products, and require special treatment before and after calendering or proofing, that of stretching being quite important. For this purpose the brush cloth-stretcher here pictured is recommended, as it smooths out the cloth and improves the finish of the goods. It is used to advantage on balloon cloth during the process of coating, and works equally well for stretching and removing wrinkles from tire-building fabric, breaker fabric, sheetings, drills and stockinet. Rubberized materials or tacky goods can be smoothed and stretched on this machine, without damage to finish, during the process of spreading.

The principle of stretching cloth from the center toward the selvage with this device is said to differ from that of any other employed for a similar purpose. The bristled rolls are made up of disk units, into which the bristles are set at an angle.



BRUSH STRETCHER THROWN OFF DRUM OR CALENDER ROLL

These disks are assembled and firmly locked upon a shaft, so that the bristles point outward from the center of the shaft. The mounted shafts are hung upon a frame designed to allow the application of the bristled rolls to the drying cylinders or calender rolls or other surface, at any desired pressure, which is regulated according to the nature of the fabric to be stretched and the amount of stretch desired. An important feature of this stretcher is that it does not require to be threaded-up. The cloth is run on the calender roll or drum in the usual way, and the stretcher rolls are brought in contact with the goods. They may be quickly removed by a simple adjustment device. The stretcher rolls are not mechanically driven, but revolve when brought in contact with the moving surface of the goods. Each bristle catches a different thread of the fabric at the same time, which has the effect of pushing the cloth outward from the center toward the selvage without any undue strain, as the action of the multitude of bristles working in unison is absolutely uniform, and the perfect flexibility of the bristles eliminates all possibility of disturbing the finish of the goods in any way. (Sidney Birch Co., Inc., Mansfield, Massachusetts.)

PROCESS PATENTS.

- N^{O.} 1,281,374. Balloon manufacture and varnishing. H. E. Honeywell, St. Louis, Mo.
 1,281,757. Tire repairing. G. E. Blaylock, Baltimore, Md.
 1,282,160. Sealing ends of rubber hose. J. W. Young, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.
 1,282,259. Electrolytic process for producing metal-surfaced articles, such as rubber-shoe lasts. M. M. Merritt, Danvers, assignor to Copper Products Co., Boston, both in Massachusetts.
 1,282,460. Applying finish coating to surfaces. C. H. Parkin, Cleveland, O.
 1,282,767. Preparation of tread and sidewall stocks for tires. B. Darrow, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

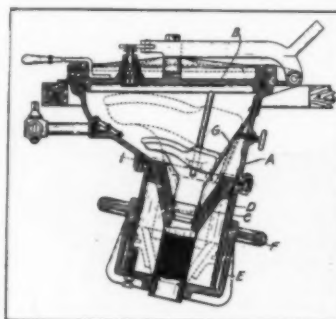
THE UNITED KINGDOM.

- 119,178. Covering rubber-covered electric cables. Fullers Wire & Cable Co., and G. Fuller, Woodland Works, Grove Road, Chadwell Heath, Essex.

MACHINERY PATENTS.

PNEUMATIC SHOE-PRESS.

THIS invention consolidates the parts of a rubber boot or shoe before vulcanization, by the action of compressed air or a suitable fluid under pressure and control by the operator.



GAMMETER'S SHOE-PRESS.

The receptacle *A* is provided with a hinged cover *B* of the breech-block type. A cup-shaped conoidal last support *C* is lined with soft rubber that accommodates different lasts and seals the chamber by means of the end of the last. The adjustment for different lengths of lasts is effected by the movement of the last support that slides in the cylinder *D*. The stem of the last-support has a left-hand

thread screwing in the end of *E*, which has a right-hand screw connection with the cylinder-wall exterior and adjustable by handwheel *F*. A spring plate *G* forms a back-rest for the lasted shoe.

A last with a shoe thereon is placed in the chamber with the top of the last resting in the last-support, and the back of the heel resting against the back-rest. The cover is then closed and locked and the compressed air turned into the chamber, its effect being to force the last more tightly into the packing member and also to press the shoe tightly against the surface of the last. The air between the shoe and the last is expelled through the vent holes and the parts of the shoe are consolidated by the difference between the pressure of the atmosphere on the inside of the last and the external pressure in the chamber. When the operation is completed the chamber is opened and the lasted shoe removed and vulcanized in the usual way. (J. R. Gammeter, Akron, Ohio, assignor to The B. F. Goodrich Co., a corporation of New York, United States patent No. 1,283,144.)

OTHER MACHINERY PATENTS.

THE UNITED STATES.

- N^{O.} 1,281,461. Trimming machine. A. J. Wills, Brookfield, Mass.; M. B. Wills, executrix of A. J. Wills, deceased.
 1,281,463. Machine for plaiting rubber fabric. A. J. Wills, Brookfield, Mass.; M. B. Wills, executrix of A. J. Wills, deceased.
 1,281,522. Collapsible core for tires. F. B. Converse, Akron, O., assignor to The B. F. Goodrich Co., New York City.
 1,281,600. Collapsible core for tires. G. H. Lewis, assignor to The Fisk Rubber Co.—both of Chicopee Falls, Mass.
 1,281,660. Soapstone brush. M. A. Replogle, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
 1,282,085. Apparatus for testing rubber. W. Jameson, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.
 1,282,294. Unwrapping machine. A. W. Ross, Akron, O.
 1,282,503. Shoe-dipping machine. J. H. Wall, Bristol, R. I.
 1,282,643. Testing-machine clamp. H. L. Scott, Providence, R. I.
 1,282,644. Testing machine. H. L. Scott, Providence, R. I.
 1,283,038. Repair vulcanizer. J. E. Bancroft, Toledo, assignor to The National Rubber & Specialties Co., Cincinnati, both in Ohio.
 1,283,275. Vulcanizing-patch-holding device. W. E. Nye, Highlands, Cal.
 1,283,337. Power stitcher for retreading automobile tires. R. H. Sikes, Los Angeles, Cal.

THE UNITED KINGDOM.

- 119,241. Rubber-mixing machine. F. H. Banbury, Ansonia, Conn., U. S. A. (Not yet accepted.)
 119,242. Rubber-mixing machine. F. H. Banbury, Ansonia, Conn., U. S. A. (Not yet accepted.)
 119,269. Apparatus for trimming rubber heel-pads, soles and tips for boots, etc. Wood-Milne, Limited, and J. Sumner, Ribbles Bank Mills, Preston, Lancashire.
 119,394. Expandable tire mold. S. Yoshida, 83 Kanazugi-Kamimachi, Shitaya-Ku, Tokio, Japan.
 119,622. Calendering machine. W. J. Mellersh-Jackson, 28 Southamp-Buildings, London. (Morgan & Wright, Jefferson avenue, Detroit, Mich., U. S. A.)

Rubber-Producing Weeds in Germany.

IN the fall of 1906 the Editor of this journal was in Hanover, Germany, the guest of the late Dr. Adolph Prinzhorn, one of the founders of the Continental Caoutchouc & Gutta Percha Co. Dr. Prinzhorn in addition to his knowledge of rubber manufacture had studied crude rubber production thoroughly in South America, Africa and in the Far East. Speaking of crude rubber supplies for Germany if for any reason wild and plantation sources failed, he said:

We have done much in synthetic rubber, and if forced to do it could make it in quantity in times of peace. If we were at war, however, the basic materials for such manufacture would not be available. Therefore, I do not believe that we could depend upon synthetic rubber. There are, however, as you know, many lesser producers found in the temperate zone, as the milkweed, for example. We have many such in Germany, Austria, Asia Minor and in Southern Russia. Were crude rubber so scarce that it sold in Germany, say, at \$10 a pound, such sources would inevitably be utilized. Indeed, they are all being examined and classified by our botanists as a possible supply if normal sources become unavailable. They also offer cultivation possibilities for rubber alone, or for rubber, fiber, and other useful by-products.

Reviewing the conversation in the light of the present situation in Germany, it is wonderfully interesting. Very little rubber from the Amazon, from Africa, or from the great plantations in

THE "SICILIAN ARTICHOKE."

The *Abractylis gummifera* L. is a composite, similar to the artichoke in appearance, and yields considerable rubber. It is not found wild in Germany proper, but was cultivated there. The root analyzes as follows:

	Per Cent.
Rubber	36.46
Resin	51.52
Organic impurities	1.40
Inorganic	2.31
Albumen	4.07
Moisture	4.24

THE SPINDLE TREE.

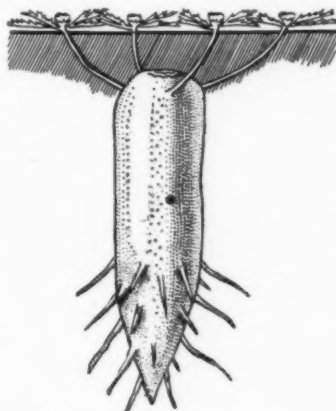
The genus *Euonymus*, of which there are found three varieties, is very common all over Europe. It is commonly known as the Spindle tree. Of the three varieties, *E. Europaenus* L., *E. vulgaris* Scopoli, and *E. angustifolius* Vill., none are thought to contain enough rubber to warrant extraction.

THE SOW THISTLE.

Of the three species, the *Sonchus oleraceus* L. is the most promising. Dr. Kassner, in the "Chemiker-Zeitung," more than 20 years ago declared that it was worthy of serious attention. The plant, according to his analysis, contained valuable green and yellow dyes, wax, a flexible wool useful in paper manufac-



SONCHUS OLERACEUS.



ABRACTYLIS GUMMIFERA.



EUPHORBIA CYPARISSIAS L.

the Middle East has been received by the Central Powers since 1914. The amount that was smuggled in through neutral countries was so small as to be practically negligible. Furthermore, crude rubber sold in Germany at \$12 per pound. In spite of this, much rubber was used. Zeppelins, observation balloons, airplanes, submarines, field telephones, and scores of other war appliances used rubber up to the last. Was it largely synthetic rubber or was it obtained from shrubs and plants grown in Germany?

Of German plants known to contain rubber there are several that have attracted attention. Indeed, fully 20 years ago the idea of growing rubber in Europe was seriously discussed. Several indigenous *Compositae*, *Apocynaceae* and *Euphorbiaceae* were found which yielded rubber or a rubber-like gum. Among these are *Sonchus oleraceus* L., or *Laiteron*, of Central Europe; the *Abractylis gummifera* L., of Sicily, and in Germany the *Arzneibush* and the Wolfmilk group, *Euphorbia palustris* and *Euphorbia cyparissias*, together with the *Euonymus Europeus*, a dogwood known as *Fusain* or *Spindle tree*.

ture, and india rubber. The bagasse, consisting of more than 60 per cent of the whole, formed an excellent fodder with a proportion of 2½ per cent of nitrogen and 15½ per cent albumen. The sow thistle, originally a native of Europe, is now found in the temperate zone nearly all over the world, and is often carelessly called milkweed.

THE WOLF-MILK TREE.

Three native *Euphorbias*, or wolf-milk trees, the *E. pilosa*, *E. palustris* and *E. cyparissias*, are found in Central Europe, and all contain rubber.

According to Scheermesser, these *Euphorbias* are well worth exploitation. His procedure was to gather the nearly matured plants, dry and grind them to a coarse powder. This was treated with a solvent. The extract, dark-green and pungent, contains a rubber-like substance and fat. It was estimated that one hectare (2.47 acres) of *E. cyparissias* would produce 50 kilos (110 pounds) of rubber and 140 kilos (309 pounds) of fat. The latter is useful in soap manufacture, and is said to have food value also.

ANOTHER RUBBER WEED.

There is still another plant, a pest in times of peace, that has been examined for the rubber it contains. It is the *Tithymalus peplus*. Cultivated and treated in the same manner as the *Euphorbias*, it produces per hectare 43 kilos of rubber and 120 kilos of fat. Not quite as good as the *Euphorbias*, but perhaps worth exploitation when labor is forced, fats almost unobtainable, and rubber worth \$12 a pound.

THE EDITOR'S BOOK TABLE.

FUNGI AND DISEASES IN PLANTS. BY E. J. BUTLER, M. B., F. L. S. Thacker, Spink & Co., Calcutta and Simla, India. (Cloth, 6¼ by 9¼ inches, 206 illustrations, 547 pages.)

THIS valuable handbook on the crop diseases of India caused by fungi is practically if not actually the first in an important and unexplored field. It was intended that the book should be primarily for the use of the trained staff of the Agricultural Departments in India, but will be found useful to every planter and to students of plant diseases. The book deals with field and plantation crops only. It is divided into two parts, the first of which comprises a general treatment including chapters on the nature of fungi; the food of fungi; life-history of parasitic fungi; the causation of disease by fungi, and the principles of the control of plant disease. The second part treats of special diseases of many Indian crops, concluding with a chapter of the diseases of rubber (*Hevea*, *Manihot*, *Castilloa* and *Ficus*).

Ten rubber-tree diseases are minutely described in their various phases, and methods of control are suggested where known. The well-known "pink disease" and "black thread" are stated by the author to be, at present, the most serious diseases of *Hevea* in India.

THE NETHERLANDS INDIA RUBBER YEAR BOOK, 1918-1919. Second edition. Published (in Dutch) by the "Netherlands India Rubber Journal," Batavia, Java. (Octavo, 282 pages.)

This little reference work gives information about rubber growers and rubber traders' associations in the Dutch East Indies and elsewhere, about experiment stations, relief funds and trade unions. It also furnishes ready-reckoning tables, rubber statistics, information about rubber markets, and a small dictionary of terms used in the rubber trade to enable Dutch East Indians to understand words they may find in trade publications printed in Dutch.

NEW TRADE PUBLICATIONS.

THE LINK BELT CO., CHICAGO, ILLINOIS, HAS ISSUED A HANDSOME 52-page booklet devoted to "Economical Handling of Coal and Ashes, and Reserve Coal Storage," with many explanatory diagrams and half-tone illustrations. It is not a catalogue, but a description of improved fuel-handling devices in many of the best industrial power-plant installations of the country, and it will be studied with interest and benefit by rubber men contemplating new plants, additions or improvements.

* * *

THE GENERAL MAGNESITE AND MAGNESIA CO., PHILADELPHIA, Pennsylvania, has issued for the convenience of rubber workers a neat four-page loose-leaf folder of heavy celluloid containing tables of factors for determining specific gravity of rubber compounds. The first table gives the volume ratios corresponding to unit weights, from one to nine, of the ordinary compounding ingredients. Similarly the second table gives volume ratios for unit weights from one to nine, corresponding to specific gravities from 1.00 to 1.70. The use of these data is explained by directions and calculated examples.

* * *

THE CENTRAL SCIENTIFIC CO., 460 EAST OHIO STREET, CHICAGO, Illinois, has issued a complete illustrated catalog of laboratory apparatus (Catalog C). All kinds of apparatus listed are "Made in America" and include a full line of everything used in testing laboratories.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(679.) A reader inquires for the address of the manufacturer of "Victor" tennis shoes.

(680.) Requests have been received for the addresses of manufacturers of zinc collars and caps for ice bags.

(681.) A foreign correspondent asks for the addresses of manufacturers of elastometers and durometers for rubber testing.

(682.) A manufacturer requests the address of manufacturers of rubber machinery for making seamless, transparent rubber nipples.

(683.) An inquiry has been received for the address of manufacturer of compounding lubricant sold in Canada under the name "Kastroleum."

(684.) Information is requested as to makers of elastic-band cutters. Prices and time of probable delivery of such machines are also asked for.

(685.) Inquiry is made for quotations on power-driven shears or machinery suitable for cutting rubber tubing two inches in diameter.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative officers. Request for each should be on a separate sheet, and state number.

(27,687.) The manager of an organization in Switzerland desires an agency for the sale of automobile accessories on a commission basis. Correspondence may be in English.

(27,691.) A man in Switzerland desires an agency for the sale of automobile and truck accessories. Correspondence may be in English.

(27,740.) A representative of an Australian firm, who is in this country, desires an agency for the sale of hat elastic, 8 or 10 cord (black or white).

(27,748.) A man from Peru, at present in the United States, wishes an agency for the sale of automobile accessories. Correspondence may be in English.

(27,762.) An importer and commission agent in Southern Italy desires an agency for belting.

(27,791.) A man in France wishes to secure an agency on sale of rubber goods of all kinds, automobile casings and inner tubes, waterproof cloth and clothing, and heavy rubber blocks for machinery.

(27,779.) A company in Canada desires to purchase or to secure an agency for automobile accessory specialties. Terms, cash against documents for either purchase or agency.

(27,790.) A firm in Brazil wishes to secure an agency for the sale of belting. Quotations to be f.o.b. New York. Credit terms, 120 days required. Correspondence may be in English.

(27,791.) A man in France wishes to secure an agency on commission for the sale of balata belts. Correspondence should be in French.

(27,796.) Two men who are to form a partnership in France desire an agency for automobile and truck accessories. Correspondence may be in English.

(27,810.) A company in Norway desires to purchase and secure an agency for the sale of rubber shoes. Cash will be paid. Correspondence may be in English.

(27,811.) A commission agent in France will represent firms for the sale of motor-car and motorcycle accessories. Correspondence may be in English.

New Goods and Specialties.

A SANITARY HAIR-BRUSH.

A HAIR-BRUSH that can be sterilized is something to be desired by everybody who appreciates dainty toilet accessories. The "Maid of America" hair-brush is of this type. The bristles are vulcanized into a rubber pad and this rubber pad is removable. All that is necessary to do to remove



"MAID OF AMERICA" HAIR-BRUSH.

it from the brush is to press firmly with both of one's thumbs against the side of the bristles. This springs the pad so that it can be easily removed. After the pad has been removed it can be sterilized. When replacing the pad it is only necessary to insert the heel first, catching the notch at the end where the small hole appears. The rubber then remaining out of place can be readily pressed into position. (A. Steinhardt & Bro., 860 Broadway, New York City.)



SHERMAN HOSE CLAMP.

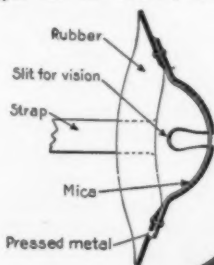
A RUSTLESS HOSE-CLAMP.

A style of hose-clamp that is made in varying thicknesses of different sizes is shown here. It is rust-proof throughout, will not injure hose, and wears for a long time. A long tongue, shaped and run in the channel, prevents the hose from bulging between the ears and insures an even grip all around. The clamp conforms to the shape of the hose. Stiff, heavy ears form the nut lock, preventing the nut from turning

when tightened; and they cannot tip together when drawn up. There are also heavy shoulders which give a good bite to vise jaws, so that the clamp can be drawn exceedingly tight. (H. B. Sherman Manufacturing Co., Battle Creek, Michigan.)

SHRAPNEL GOGGLES.

Professor Terrien, an eminent French eye specialist, and Major M. E. Cousin, observing the large number of French



Courtesy of "Popular Science Monthly."

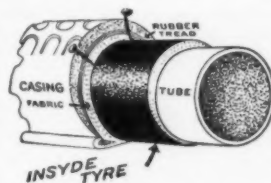
RUBBER-BRIMMED EYE-PROTECTORS.

soldiers injured in the eyes, not long ago devised an eye-shield, shown herewith. The goggles are pressed from a plate of metal

one millimeter thick, convex in shape, with transverse vertical and horizontal slits underlaid with mica, for the admission of light. The brims are covered with rubber to make them gas-proof. These goggles prevent many injuries.

THE "INSIDE TYRE."

A new device to take some of the pressure from inner tubes against the outside tire of automobile wheels has been devised, which is illustrated here in section. It is made of tough fabric vulcanized over a tire mold so that it fits the inside of a tire casing exactly. The outside is coated with rubber which vulcanizes itself to the inside of the casing, thus preventing slipping, while the part that comes in contact with the tube is coated with rubber which has been treated so that the tube will not stick to it. This device increases the life of tires and can be used over again after the outside tire is worn out. (The American Automobile Accessories Co., Baltimore & Ohio Railroad and Blue Rock street, Cincinnati, O.)



A GOOD-LOOKING ACCELERATOR FOOT-REST.

A new contrivance intended to guard against unintentional rapid acceleration when driving over rough roadways or street crossings, and to relieve the foot from continuous tension,



THE "STANWOOD" ACCELERATOR FOOT-REST.

is embodied in the good-looking device shown herewith. It is composed of an indented rubber roller vulcanized to a steel tube which revolves on a steel spindle riveted to the uprights. Graduated indentations make the foot-rest adjustable to various heights and positions, the adjustment being made by means of tightening nuts. The Stanwood adjustable accelerator foot-rest is adaptable to all makes of cars and permits delicate advancement or retarding of acceleration.

(Stanwood Equipment Co., 307 Plymouth Court, Chicago, Illinois.)

IDENTIFIABLE TOBACCO CONTAINER.

A container for tobacco which provides a place for the insertion of an identification card and a photograph must appeal to the heart of every soldier who smokes. The one illustrated is made of waterproof material with a flap provided on the inside with a mica or similar shield to cover the identification card of the owner and a small photograph. This container will hold any stock size package of granulated tobacco and manufactured cigarettes. The original package is thus kept intact and is protected from moisture, while it keeps in one place all necessary articles. (L. Sence & Son, 110 West 14th street, New York City.)



THE "TRENCHER."

Interesting Letters From Our Readers.

AN EXCEEDINGLY GRATIFYING LETTER.

THE Rubber Association of America is in receipt of a letter from the Rubber Trade Association of London, regarding an article which appeared in "Truth" of London, and which caused much indignation on this side of the water. That the British rubber trade were equally indignant was also at once made manifest in letters and telegrams. Now that a definite protest comes from the Associated Rubber Manufacturers in Great Britain the incident is closed, and good feeling is wholly restored. The letter follows:

TO THE RUBBER ASSOCIATION OF AMERICA, INC.:

DEAR SIRS—I beg to acknowledge with many thanks your various communications to the rubber trade.

In particular we are obliged for the reprint of the leading article from THE INDIA RUBBER WORLD in the current month's issue. That article had already excited considerable interest in the trade here, and I beg to assure you that we are in hearty sympathy with it. The whole matter was brought up at a general meeting of our Association held here to-day, when it was unanimously resolved that I should communicate the trade's opinion to you.

Perhaps I may mention that immediately these very objectionable articles appeared in "Truth" one of our committee communicated with the Editor, contradicting the statements and the whole basis of his offensive insinuations. No one here has anything but severe condemnation for the baseless charges brought by the financial journals against American manufacturers. We, at all events, thoroughly appreciate the high character and fair dealings of these gentlemen, and we can only express our great regret that papers here should lend themselves to such groundless and objectionable matter.

If you can conveniently do so, we should be greatly indebted to you if you would convey the sense of this to your members, as we consider it of great importance that they should realize clearly how strongly we feel on the subject. This is not a time when any possible misconception should be allowed to arise between us.

Yours faithfully,

FOR THE RUBBER TRADE ASSOCIATION OF LONDON.

J. D. JOHNSTON, *Chairman*.

London, England, October 30, 1918.

INFORMATION ABOUT RUBBER SUBSTITUTES IN GREAT BRITAIN.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—In the department headed "The Rubber Trade in Great Britain," in your issue of October 1, 1918, we notice a few remarks with regard to rubber substitutes, which are, in our opinion, somewhat incorrect, and are liable to cause your readers to receive a wrong impression.

As you are aware, we have been manufacturing india rubber substitutes, both white and dark, for many years past, and since the outbreak of hostilities have been supplying large quantities of the finest grades for use in connection with government contracts, and owing to the action of the Ministry of Food, Oils and Fats Branch in restricting the use of vegetable oils for certain specific purposes it was impossible for some months for any substitutes to be manufactured, and in this respect only, your correspondent is correct.

Owing to the demand for the india rubber substitutes, representations were made to the Ministry of Food by ourselves and several firms manufacturing these materials, and as a consequence an association was formed called "The India Rubber Substitute Manufacturers' Association," in order that the trade could be rationed as far as supplies of vegetable oils were concerned, and at a meeting between representatives of the association and the

Industries Sub-Committee of the War Priorities Committee this committee decided that an allocation of oils sufficient for all orders, accompanied by Priority Certificates should be made, and further, that an allocation up to 60 per cent. of the amount used in the year 1917 should be made for civil work. The action of this committee is therefore sufficient evidence to prove that the material is required for work of national importance.

Your correspondent further states that the amount of mineral matter added to the substitutes shows a tendency to increase. As far as we are concerned this is not the case. We have been manufacturing several grades of both white and dark qualities, and the finest of these contain very little mineral matter, but, of course, it is possible to obtain cheaper grades containing fairly large amounts of mineral matter.

In our opinion, india rubber substitutes should be considered more as compounding ingredients than as adulterants, because, as is well known, india rubber substitutes are incapable of being used by themselves, and further, in many cases the use of india rubber substitutes is essential to obtain certain physical results.

In conclusion we would like to add that before the war we shipped very large quantities of india rubber substitutes, particularly in white grades, to your country, which in itself is sufficient to show that the india rubber trade in the United States made use of this material to a large extent.

Yours faithfully,

TYPKE & KING, LIMITED.

W. W. KING, *Director*.

RUBBER-PRODUCING PLANTS IN SICILY.

TO THE EDITOR OF THE INDIA RUBBER WORLD:

DEAR SIR—For several years I have been studying, from a scientific and industrial standpoint, several rubber plants and have found that some of them, which are indigenous to Sicily and Libya, contain a good quantity of rubber for industrial use. These plants are rather abundant in a wild state and can easily be cultivated.

But to make use of these plants, and control their possibilities, I need adequate financial means, and would like to get in touch with people who would be willing to associate themselves with me in this undertaking. I am ready to furnish all necessary explanations.

I ask you therefore to communicate my wish to your readers and thank you in advance.

GIOVANNI ETTORE MATTEI.

Via Maestri d'Acqua al Massimo 5, Palermo, Sicily.

TIRE TALC AND GRAPHITE FOR INNER TUBES.

Tire talc makes the best lubricator between the inner tube and the casing. Caution should be exercised in its use, however, because if too much is used a quantity will collect in one place, generating heat and forming a weak spot. The B. F. Goodrich Co., Akron, Ohio, says that the talc should be distributed evenly over the surface; sifting on the tube when revolving is a simple and efficient method.

Graphite is an excellent lubricator for tires subjected to extra heavy duty and excessive speeds. Racing drivers use graphite, but only after sifting on to the revolving tube through a sieve made of cheesecloth. This method is necessary, otherwise several flakes of graphite might accumulate in one point thereby causing deterioration—the oil in graphite being a foe to rubber.

For the average motorist who does not run his car continuously, day in and day out, the judicious use of tire talc is recommended.

News of the American Rubber Industry.

CHARLES B. SEGAR, PRESIDENT OF THE UNITED STATES RUBBER CO.

CHARLES B. SEGER, chairman of the board of directors of the Union Pacific Railroad System, was elected president of the United States Rubber Co., New York City, at the regular meeting of its board of directors held December 5, 1918. Mr. Seger will retire from railway management and devote himself to the rubber industry. Colonel Samuel P. Colt, who has served the company for eighteen years as president, was elected chairman of the board. Lester Leland, for many years vice-president of the company, was elected vice-chairman.

Resolutions were passed by the board of directors expressing high appreciation of Colonel Colt's faithful and able services in advancing the company's annual business from \$25,000,000 to \$200,000,000; in greatly expanding the scope of its manufactures, notably in tires; by acquiring other companies; in making direct provision for the production of a substantial part of its crude rubber on its own plantations in Sumatra; and in the permanent funding of the company's large indebtedness.

The control of the company remains the same as for many years. Colonel Colt will continue to direct the financial policy, with more time to devote to special work for the benefit of the company. Mr. Leland, long with the company, is known to be in hearty accord with Colonel Colt's policies. Under the by-laws revised last year Mr. Seger, the newly elected president, will have direct charge of operation.

NEW INCORPORATIONS—1918.

Connecticut Tire & Rubber Co., Inc., December 18 (New York), \$2,000. H. S. Hartstein, 250 Havemeyer street, C. S. Weldon, 591 7th street, M. Kittay, 723 Monroe street—all of Brooklyn, New York. To manufacture tires, etc.

Highland Rubber Corp., December 18 (New York), \$50,000. L. R. Eastman, 116 West 39th street, C. L. Eastman, 213 West 40th street, D. D. Deutsch, 1789 Broadway—all of New York City. To deal in tires and tubes.

Hygeia Respirator Co., The, December 11 (New Jersey), \$35,000. N. Schwartz, 251 West 34th street, New York City; L. Schwartz, 32 Monroe street, B. Spitzer, 21 Monroe street—both of Passaic, New Jersey. Principal office, 32 Monroe street, Passaic, New Jersey. Agent in charge, L. Schwartz. To manufacture, buy and sell gas-masks.

Keystone Solether Corp., December 3 (New Jersey), \$25,000. G. H. Bruce, 320 Broadway, New York City; D. Stone, 524 Ingham avenue, Trenton, New Jersey; F. J. Bruce, 286 Sixth avenue, Brooklyn, New York. Principal office, 524 Ingham avenue, Trenton, New Jersey. Agent in charge, D. Stone. To manufacture synthetic and artificial leathers, floor coverings, gasket sheeting and combined rubber and fiber products of all varieties.

Ninigret Mills Co., The, November 20 (Rhode Island), \$550,000. F. E. and C. S. Fowler and C. Perry—all of Westerly, Rhode Island. Principal office, Westerly, Rhode Island. To manufacture, buy, and sell all kinds of textile fabrics, including auto tire fabric.

O'Connor & Haupt, Inc., December 6 (New York), \$2,000. J. Wagner, 19th street, Elmhurst, New York; H. J. O'Connor, 1517 avenue A, W. Haupt, 325 east 51st street—both of New York City. To deal in tires and rubber goods.

Para Tire Sales Corp., December 18 (New York), \$3,000. T. O'Callaghan, Hollis, Long Island; C. W. Reynolds and W. B. Harris—both of 129 West 37th street, New York City. To sell tires.

Tire Export Co., Inc., December 5 (New York), \$2,000. S.

Bernheim, 35 Nassau street, New York City; C. A. Weldon, 591 7th street, M. Kittay, 723 Monroe street—both of Brooklyn, New York. To manufacture tires.

Universal Rubber Products Co., Inc., December 4 (New York), \$250,000. L. and G. Harrington and E. Renard—all of 1476 Broadway, New York. To manufacture tires, rubber goods, etc.

White Plains Tire & Rubber Co., Inc., December 18 (New York), \$1,000. H. S. Hartstein, 250 Havemeyer street; C. S. Weldon, 591 7th street; M. Kittay, 723 Monroe street—all of Brooklyn, New York.

RUBBER FLOORING EXHIBIT.

The United States Rubber Co., New York City, made a very interesting exhibit of rubber tiling and matting at the National Hotel Men's Exposition held in Madison Square Garden, New York, December 16 to 21. The display consisted of "Usco" molded sheet rubber flooring, stair treads and perforated matting. The flooring is made in a wide range of designs and color



EXHIBIT OF THE UNITED STATES RUBBER CO.'S MECHANICAL GOODS DIVISION.

effects and is rapidly increasing in popular favor. Owing to its excellent wearing quality and security of footing it is replacing carpets on marble stairs in many of the large hotels and theatres. Areas totaling from 1,000 to 5,000 square feet are in service in several of the principal hotels in New York City.

Another interesting feature was the "Usco" non-slip stair tread which is secured in place by means of rubber cement and requires no drill holes or metal nosings.

The exhibit was in charge of Albert C. Heyman, sales manager of the United States Rubber Co.'s tiling department for New York City and State.

J. P. DEVINE CO. EXPANDING.

The J. P. Devine Co., Buffalo, New York, manufacturing vacuum drying apparatus and equipment for rubber mills, is building a two-story brick and steel addition to its machine shop, to be 26 by 102 feet, at a cost of \$11,000. New machinery to be installed for the manufacture of special apparatus on a large scale made this extension necessary. The foundations for a new foundry are also being put in. This building will be 90 by 160 feet when completed.

CHARLES B. SEGER.

CHARLES BRUNSON SEGER, the newly elected president of the United States Rubber Co., was born in New Orleans, Louisiana, August 29, 1867. He was educated in the public schools of that city, his business experience beginning as



CHARLES B. SEGER.

office boy with Morgan's Louisiana & Texas Railway and Steamship Co., successively rising from clerk to steamship auditor, traveling auditor, and chief clerk to general auditor, he became auditor and secretary of the Galveston, Harrisburg & San Antonio Railway Co., and Texas and New Orleans Railroad and Direct Navigation Co., also holding the same offices in the Galveston, Houston & Northern Railway Co. In 1900 he went to San Francisco as auditor of

the Pacific System of the Southern Pacific Railway Co., a few years later becoming general auditor of the Union Pacific System, rising to comptroller in 1911, and being elected vice-president in 1913. In 1918 he was made chairman of the executive committee of that system.

It will thus be seen that Mr. Seger has spent the larger part of his business life in leading railway systems, but he is connected with the management of many important corporations, including the United States Trust and Mortgage Co., Western Union Telegraph Co., New York Central Railroad Co. and Illinois Central Railroad Co., being a member of the executive committees of the last two organizations mentioned. For the past two years he has been a member of the board of directors of the United States Rubber Co. and of its executive committee.

He will retire as chairman of the board of directors and as president of the several companies comprising the Union Pacific System and devote his time largely to the affairs of the United States Rubber Co. His broad general experience and his familiarity with the affairs of this company will make him eminently fit for the new and responsible duties now devolving upon him.

TRADE NOTES.

The Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, manufacturer of electric controlling devices, held a conference in that city during the week of December 7, 1918, for the benefit of its men who direct the district office sales of wiring devices, push-button specialties, and molded insulation. W. C. Stevens, sales manager, A. H. Fleet, manager of the wiring devices department, and Edward Karl were in charge. The various district offices were represented by M. F. Coyne, Boston; F. J. Walker, New York; G. W. Donkin, Pittsburgh; C. N. Gilmore, Cleveland, and Z. S. Myers, Chicago.

The Republic Rubber Co., Youngstown, Ohio, in addition to its offices in the Singer Building, New York City, its premises at 229 West 58th street, and its service station at 213 West 64th

street, has leased a part of the building at 228-230 West 58th street, in the same city.

The Hardman Rubber Corp., Belleville, New Jersey, has acquired the business of the Endurance Tire & Rubber Co., New Brunswick, and will move to the latter place where it will make a new line of cord tires for pleasure cars and trucks, as well as tire tubes.

The G. & J. Tire Co., Indianapolis, Indiana, a subsidiary of the United States Rubber Co., New York City, is building a new warehouse.

The American Rubber Corp., New York City, has removed from 225 West 52nd street, to 1974 Broadway, where it will maintain offices and sales room. It has also opened a repair department.

The Independent Airless Tire Co. has secured a factory at Independence, Missouri, and is installing machinery which it hopes to have in operation within the next few months. The officers of the company are: E. S. Galloway, president; Eben Miller, vice-president; Harold Galloway, treasurer; and E. C. Harrington, secretary.

The Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pennsylvania, manufacturer of "Yarway" power-plant devices, has acquired a three-acre tract of land at Mermaid lane and Devon street, on the line of the Chestnut Hill division of the Philadelphia & Reading railroad. A three-story stone mansion on the premises is being converted into general offices and a one-story machine shop has been erected and is now in operation.

The Norwalk Tire and Rubber Co., Inc., Norwalk, Connecticut, is making a new fibre sole composed of long-strand fibres and rubber in such a manner as to permit it to be sewed or nailed in the same way as leather soles.

The Ajax Rubber Co., Inc., New York City, at a meeting of its directors held on December 17, 1918, duly resolved to issue 20,000 additional shares of common stock, par value \$50, in order to provide \$1,000,000 additional working capital. The entire issue has been underwritten to net the company the amount needed. Stockholders of record on December 27 were entitled to subscribe for the new shares at the rate of ten for each 71 shares already held, at \$55 per share.

The Archer Cord Tire & Rubber Co., 711 15th avenue, N. E., Minneapolis, Minnesota, at a stockholders' meeting held on November 18, 1918, elected the following directors: W. P. Bigelow, William A. Bieter, Maurice A. Hessian, Frederick Graham, Dr. W. B. Cory, Thomas Wilder, and Vance Chamberlain. These, in turn, elected the following officers: W. F. Bigelow, president; William A. Bieter, vice-president; and Maurice A. Hessian, secretary and treasurer. The company will manufacture cord fabric casings and automobile tubes on a large scale, in addition to its regular cord tires. It has installed special machinery for the purpose.

The Rouden Manufacturing Co., 1361-1365 Atlantic avenue, Brooklyn, New York, makes "Liberty Brand" hospital sheeting, "Gem" metal hot-water bottles, and "Excellento" ice bags. It is one of the largest producers of ice bags in the world. It also manufactures high-grade metal caps and collars for manufacturers of druggists' sundries. This plant is unique in that it manufactures for itself all of its own varied products under one roof.

After the first of the year, J. Spencer Turner Co., 86 Worth street, New York City, will handle the product of the Lowell Weaving Co., manufacturer of Sea Island and Egyptian tire fabrics.

J. Spencer Turner Co., New York City, will move this month to 56 Worth street. The interior of the building has been remodeled, affording modern offices in the center of the cotton goods district.

VAST PEACE OPPORTUNITIES IN THE AMERICAN RUBBER INDUSTRY.

IN a recent press interview, Colonel Samuel P. Colt, chairman of the board of the United States Rubber Company, New York City, outlined at some length the vast opportunities awaiting the American rubber industry on the coming of peace. Extracts from his statement follow:



COLONEL SAMUEL P. COLT.

AMERICAN RUBBER INDUSTRY DEPENDENT ON FOREIGN COUNTRIES.

The rubber manufacturing industry in America stands about fourth or fifth in the value of its products. It is dependent wholly upon crude rubber produced in foreign countries, largely by foreign capital. The entire automobile industry rests upon the rubber industry, as that in turn is built

upon the steady flow of crude cultivated rubber from the Far East. There is probably no other industry in the United States so dependent upon foreign countries as the rubber industry.

The United States has always been the largest manufacturer of rubber goods. The value of rubber manufactures in the United States for the year 1917 was nine hundred million dollars. This is approximately seven times as much as the value of rubber manufactures in the next largest manufacturing country and more than twice as much as the rest of the world put together. In ten years the United States has increased its consumption of crude rubber from 24,000 tons to 177,000 tons, while Great Britain, the next largest manufacturer, increased from 14,000 to 26,000 tons. While Great Britain was doubling her consumption we multiplied ours by nearly seven and a half.

AMERICAN MANUFACTURERS SHOULD PRODUCE CRUDE RUBBER.

The great bulk of the capital invested in rubber plantations is British and amounts to about \$400,000,000. Some American manufacturers have made a start in growing rubber for their own uses in the Far East, but American investments in that direction amount to less than three per cent. of the total capital that has been put into the industry. It would seem that one of the lines of future development of the American rubber industry should be in the direction of production of crude rubber by the American manufacturer.

FUTURE TRADE OUTLOOK PROMISING.

The outlook in the rubber industry for the reconstruction period, aside from the development that may be necessary in American-owned rubber plantations, is most encouraging. Business has been good after all wars and this should be no exception. There is a good deal of money in the country and it is more widely distributed than ever before. Everything points to a huge demand, and the rubber manufacturers at least should look forward to a largely increased volume of business. In some lines of rubber goods, notably tires, the factories will be taxed to capacity to supply the home demand.

The adjustments necessitated by various restrictive measures and the specialization of production for war needs will be accomplished with little difficulty, and such products as are adapted to foreign markets will be pushed there, but in many cases it will be some time before the greatest foreign markets will be in a position to receive and pay for American goods. In the meantime, the far-seeing producer will make his plans for the great development of foreign business that awaits the American manufacturer.

GOODYEAR TIRE MACHINE PATENT INVALID.

FIRESTONE WINS IN UNITED STATES COURT OF APPEALS.

MILLIONS of dollars annually will be saved by automobile tire manufacturers by virtue of the decision handed down by the Court of Appeals for the Sixth Circuit, at Cincinnati, on December 13, 1918. In 1914, The Goodyear Tire & Rubber Co., through its president, F. A. Seiberling, started litigation against the Firestone Tire & Rubber Co. for infringement of alleged basic patents protecting the Goodyear tire-finishing machine, the patents being the one granted to Seiberling and Stevens, in 1904, and the one granted to W. C. State, in 1909.

The infringement suit was tried in the District Court of Cleveland, Ohio, both the Goodyear tire machine and the Firestone tire machine being set up in the court-room and operated in order to demonstrate the manufacture of the casings to the presiding judge, John M. Killets. Some twelve months later the Court decided the case in favor of the Goodyear company, giving the patents referred to such a comprehensive meaning that all tire manufacturers would have had to pay tribute to the Goodyear company in the shape of royalties if the verdict had been sustained.

The Firestone company appealed the case, furnishing bonds higher than any we have ever before recorded in patent litigation. After the appeal had been argued in the higher court, early in 1917, but before a decision had been rendered, new evidence was introduced relating to a patent granted to an inventor named Mathern in Belgium in 1906. In the basement of the Cincinnati Postoffice the Goodyear and Firestone machines were again set up and also a reproduction of the Mathern machine, using framework and many parts loaned by the Hood Rubber Co., of Watertown, Massachusetts, they having bought this machine from Mathern in 1909. The full bench of judges adjourned court to the basement to witness the working of the machines and then took the case under advisement for a year.

They have now pronounced the alleged basic patents to be invalid for want of invention, as well as for lack of combination. The Firestone company is freed from all charge of infringement, the decree of the District Court is reversed, and the record is remanded to the lower court with instructions to dismiss the bill.

DIVIDENDS.

The Apsley Rubber Co., Hudson, Massachusetts, has declared its regular semi-annual dividend of three and one-half per cent on preferred stock, payable January 1, 1919, to stock of record December 31, 1918.

The Archer Cord Tire & Rubber Co., Minneapolis, Minnesota, has declared a stock dividend of ten per cent, payable January 1, 1919, to stock of record December 20, 1918.

The Canadian General Electric Co., Limited, Toronto, Ontario, Canada, has declared its regular quarterly dividend of two per cent, payable January 1, 1919, to stock of record December 14, 1918.

The Kelly-Springfield Tire Co., New York City, has declared a quarterly dividend of \$1.50 per share on its six per cent preferred stock, payable January 2, 1919, to stock of record December 16, 1918.

PERSONAL MENTION.

John H. Lane, for many years with The New York Belting & Packing Co., 91 Chambers street, New York City, has been appointed manager of its advertising department.

Frank C. Risselt, well known in the rubber trade, has been appointed manager of the new office of the Cameron Machine Co., New York City, at 503 First National Bank Building, Cincinnati, Ohio.



FRANK C. RISSELT.

W. E. Byles has reestablished his brokerage and commission business in crude rubber and general Eastern produce at 59 Broad street, New York City.

Guy E. Tripp, until recently a brigadier-general, has resigned from the Ordnance Department of the Army and resumed his former position as chairman of the board of directors of the Westinghouse Electric & Manufacturing Co., 165

Broadway, New York City. Alfred W. Sewell, formerly branch manager at Buffalo, New York, for the Sewell Cushion Wheel Co., Detroit, Michigan, has been appointed manager of the Detroit branch, with headquarters at the factory.

Owen M. Pryor has been appointed distributor of the products of the Sewell Cushion Wheel Co., Detroit, Michigan, for the State of Florida, with headquarters at 1827 Pearl street, Jacksonville.

W. M. Burrell has been appointed efficiency man to study trade conditions and sell merchandise in various sections of the country for the Foster Rubber Co., 105 Federal street, Boston, Massachusetts.

John A. Fowler has been appointed a trade commissioner of the Bureau of Foreign and Domestic Commerce and will visit the Dutch East Indies and British Malaya for the purpose of extending American trade in the Far East.

Prescott C. Ritchie, Western representative of the automobile equipment department of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, has transferred his headquarters from Indianapolis to the Conway Building, Chicago, Illinois.

John B. Livingston, engineer of the storage battery department of the Eagle-Picher Lead Co., New York City, in Cleveland, Ohio, and Miss Irene Arthurs, of Pittsburgh, Pennsylvania, were married in Chicago, Illinois, on November 27, 1918.

L. E. Schumacher, for the last eight years chief inspector of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, has been promoted to the position of works manager of the Krantz Manufacturing Co., one of the company's subsidiaries, at Brooklyn, New York.

William Keane has been promoted from the position of assistant manager to that of manager of the Pittsburgh, Pennsylvania, branch of the Sterling Tire Corp., Rutherford, New Jersey.

C. D. Cortright has been appointed manager of the Rochester, New York, branch of the Sterling Tire Corp., Rutherford, New Jersey. He succeeds William E. Housel who recently was appointed a first lieutenant in the Army.

G. B. Corrigan has been appointed manager of the Boston, Massachusetts, branch of the Sterling Tire Corp., Rutherford, New Jersey, succeeding Elmer Benny who was recently transferred to the Brooklyn, New York, office.

H. J. Smith, an American rubber engineer and general manager of the Neumáticos Nacional Sociedad Anónima (National Pneumatic Co.), Barcelona, Spain, is in the United States for the purpose of purchasing solid-tire and boot-and-shoe equipment.

Frank A. Sharpe has been appointed district manager of the Thermoid Rubber Co., Trenton, New Jersey, in Detroit, Michigan, with offices in the Kresge Building.

M. A. PEARSON JOINS THE ALLEN MACHINE CO.

After January 1, Morris A. Pearson will be associated with the Allen Machine Co., Erie, Pennsylvania, in connection with the design and manufacture of a complete line of machinery for rubber goods manufacturers.



M. A. PEARSON.

Mr. Pearson's experience covers over 20 years, practically all of which has been connected with the rubber trade, where he has many valued friends. He was formerly with the Farrel Foundry & Machine Co., which he served 14 years, resigning his position in 1912 to gain a more practical knowledge of the mechanical needs of the trade, for which purpose he located in the Akron, Ohio, district. Through the offices of a prominent Akron manufacturer, he accepted a position

with the Turner, Vaughn & Taylor Co., the well-known manufacturer of rubber machinery. Within the last six years he has designed the complete mill and calender equipment for over 20 new tire factories, requiring frequent increases of manufacturing facilities. He has contributed articles of interest to THE INDIA RUBBER WORLD, and was recently elected a member of the American Society of Mechanical Engineers.

THE OBITUARY RECORD.

SPENT HIS LIFE IN THE RUBBER BUSINESS.

HERBERT C. SEVERANCE, secretary and general manager of the Racine Rubber Co., Racine, Wisconsin, died of pneumonia, induced by influenza, at his home in that city on November 21.

Mr. Severance was born in Cambridge, Massachusetts, October 28, 1878. He attended the public schools in that city, graduating from the Cambridge Manual Training School in 1897, and entered the employ of the Reading Rubber Tire Co., maker of bicycle tires. The next few years saw him affiliated with other tire concerns, his progress steadily upward. In 1900 he went to the Hartford Rubber Works Co., Hartford, Connecticut, as a salesman, and in this capacity was transferred to Minneapolis, Minnesota, as branch manager. Afterwards he managed the Detroit, Michigan, branch, and when the Hartford company was consolidated in the United States Tire Co., he remained in Detroit as branch manager, and in 1912 became manager of the Chicago branch of the United States Tire Co. In 1913 he resigned this position to become general sales manager of the Racine Rubber Co., and in 1914 was elected secretary, both of which positions he held at the time of his death.

He is survived by his widow, his father and mother, and two sisters. He was affiliated with Masonic bodies in Cambridge, Massachusetts, and Racine, Wisconsin, and was also a member of the B. P. O. Elks. Charitable, yet unostentatious, of a quiet, unassuming, and democratic character, he had many business and personal friends who deeply mourn his loss.

THE BULL'S EYE RUBBER CO.

Extensive alterations and improvements in the Long Island City plant of the Bull's Eye Rubber Co. have been completed and operations will start at full capacity early in January. Vulcanized sheet work, rubberized cloth specialties, unvulcanized tire and tube repair stocks, heels, soles, hat-bags, dash-pots and friction rings are the products. The factory is under supervision of Arthur C. Squires, and Harry W. Doherty has charge of the business management.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

THE convention of the Ohio Automobile Trades Association opened in Akron on December 5, 1918. About one thousand delegates were in attendance.

Mayor I. S. Myers opened the session and A. O. Wood, president of the Summit County Dealers' Association, also welcomed the visitors. Several addresses and papers by rubber men were features of the program.

W. O. Rutherford, general sales manager of The B. F. Goodrich Co., spoke on "Organization." He declared the war was shortened by the organization of industry and said the War Industries Board was the most powerful commission ever created. He advocated looking beyond the boundaries of this country in the organization of commerce, and expressed the opinion that the country will soon be a power in world trade. He discussed the importance of the motor truck as a means of transportation, and declared the development of a good road system is as important a factor in reconstruction as the railroad was to former eras.

A paper written by H. S. Firestone, president of the Firestone Tire & Rubber Co., was read by C. M. Hamel, his secretary, Mr. Firestone being unable to attend. Rubber, Mr. Firestone maintained, is the most important commodity in the world. In 1917, he said, \$189,000,000 worth of rubber products were manufactured; the figure this year will amount to \$800,000,000. He declared that the rubber industry is bound to grow. Aside from the growing demand in this country, he said, Germany must buy rubber. A section of a tire from a captured German airplane was exhibited, showing it to be made from rubber scrap and rattan.

F. A. Seiberling, president of The Goodyear Tire & Rubber Co., who was to have spoken on the subject "After the War—What?" was unable to reach the city in time. In his place, Harry Quine, advertising manager of the Goodyear company, spoke. He read a telegram from Mr. Seiberling, declaring that Akron is ready for prosperity and that labor and materials alone are needed.

Mr. Quine advocated a Highway Department in the President's Cabinet. He said the road system of the state will be a powerful factor in future transportation because of the growing popularity of the motor truck as a freight and express-hauling medium.

Resolutions were passed advocating the repeal of the Sherman anti-trust law; to indorse the standardization of tires as an economy measure; to indorse all other economy measures advocated during the war by the Council of National Defense; to reinstate in their former positions all returning soldiers; to appeal through the state organization for the elimination or correction of all unscrupulous dealers, and to urge the creation of a highway board whose function shall be to boost good roads.

Confidence in the outlook for a prosperous period of reconstruction, and advocacy of more complete organization of the factors of the automobile trade, seemed to be the key-notes of the convention.

The delegates were taken in trucks to the various rubber factories of Akron and shown through the plants.

The General Tire & Rubber Co., Akron, held its annual sales convention December 4-5, 1918, at which approximately 150 salesmen and distributors from all over the country were present. Intensive sales plans for the coming year were discussed and a comprehensive national advertising campaign laid out.

"The New Opportunity" was the subject of an address by W. C. D'Arcy, president of the Associated Advertising Clubs of the World.

The entertainment included special lunches served at the company's plant, a lake dinner at Young's Hotel, theatre parties and the annual banquet at the Akron City Club.

The company is building a new three-story structure to house its offices, a new power-house, and other additions to its plant.

C. J. Hazen has been placed in charge of advertising and publicity for The General Tire & Rubber Co.

The B. F. Goodrich Co., Akron, has recommended to its employes a home-purchase plan similar to its group plan of life insurance. Suggestions are being received by The B. F. Goodrich Co. for a memorial to be erected in memory of the 31 Goodrich employes who have been killed or died in service.

James W. O'Meara, of the News Bureau of The B. F. Goodrich Rubber Co., Akron, has been mustered out of service and returned from Camp Taylor, where he entered the last Officers' Training School.



ANNUAL BANQUET OF THE GENERAL TIRE & RUBBER CO.'S SALESMEN.

The Miller Rubber Co., Akron, has converted \$3,000,000 worth of its authorized first preferred stock into 8 per cent second preferred stock, of which \$2,000,000 has been underwritten. The company has completed all of its building operations.

The Mason Tire & Rubber Co., Kent, at its annual meeting on November 25, 1918, reelected all of its directors, as follows: O. M. Mason, D. N. Mason, D. M. Mason, M. B. Mason, R. W. MacKinnon, J. H. Diehl, and W. A. Cluff.

The report of the company for the fiscal year ended October 31, 1918, shows gross sales of \$2,324,144.19 in 1918 against \$1,200,000 in 1917; net profit of \$203,406.47 in 1918 against \$104,457 in 1917; and declared dividends of \$132,861.16 in 1918 (including 6 per cent payable on common stock during 1919) against \$48,486 in 1917.

John H. Diehl, general sales manager and one of the directors of The Mason Tire & Rubber Co., Kent, has been elected vice-president, in charge of sales.

The Firestone Tire & Rubber Co. held its annual meetings of stockholders and directors, including several thousand employes, at the Firestone Club House, Akron, on December 16, 1918. H. S. Firestone, president of the company, presided, and stated that the sales for the year had amounted to \$75,801,506.79 against \$61,587,219.29 during the preceding year, an increase of \$14,214,287.50, or 23.7 per cent. The profits for the year, after allowing for depreciation, losses, taxes, etc., were \$8,320,442.26, which included \$2,610,000 paid in dividends.

During the year the company's plant known as No. 2 was completed and used exclusively for government work, but this work has now been practically completed.

The addition to the power-house is nearly finished and all machinery is on hand and paid for with the exception of a 25,000-horse-power steam turbine to be delivered in January.

The Mohawk Rubber Co., Akron, has increased its capital from \$10,000 to \$50,000, to take care of the growth of its business.

The Wellman-Seaver-Morgan Co., Cleveland, Ohio, known the world over as the manufacturer of general and special machinery, has opened offices at Akron, Ohio, for the convenience of rubber manufacturers. It will manufacture a new line of machinery to include calenders, mills, tubing machines, vulcanizing presses, molds, and cores, with a special type of 200-ton solid-tire applying press.

The H. J. Adams Co., representing manufacturers and importers of raw materials for the rubber industries, has established itself at 624 Second National Bank Building, Akron, and will carry in its warehouse in the same city stocks of all principal items.

THE GOODYEAR TIRE & RUBBER CO. STATEMENT.

According to the annual report of this company for the fiscal year ended October 31, 1918, the last year's business has been the most successful in volume and profits in the history of the concern. Sales were \$131,247,382 against \$111,450,643 for the preceding year; net profits were \$15,388,190 against \$14,044,216 for the preceding year. During the year dividends were paid on the capital stock as follows: First preferred, 7 per cent, \$1,693,328; second preferred, 8 per cent, \$506,407; common, 12 per cent, \$2,451,816.

The balance sheet as of October 31, 1918, follows:

ASSETS.		
Plant, as per books:		
Real estate and buildings.....	\$15,577,398.80	
Machinery and fixtures.....	14,207,646.81	
		\$29,785,045.61
Patents, trade-marks, designs.....		1.00
Securities owned—Book values:		
United States Liberty Loan bonds (all issues)	1,466,950.00	
Miscellaneous.....	3,896,552.69	5,363,502.69
Preferred stock, purchased and held in Treasury:		
1st Preferred (1,475 shares, par value \$147,500).....	135,465.44	
2nd Preferred (145 shares, par value \$14,500).....	14,170.80	149,636.24
Notes receivable of officers and employees for capital stock, secured by such stock to the par value of \$1,472,200.00.....		1,112,017.19
Employees' subscriptions for 2d preferred stock (balance unpaid).....		513,633.24
Inventory and current assets:		
Inventory.....	\$30,507,966.81	
Accounts and notes receivable (provision in reserve for doubtful items, \$231,445.30—see Contra).....	13,353,985.00	
Advances to agents, salesmen and companies.....	2,101,278.25	
Cash on deposit and on hand.....	6,344,490.11	52,307,720.17
Advances to the Goodyear Improvement Co. and to The Goodyear Heights Realty Co.....		3,488,956.62
Suspended assets (provision in reserve for doubtful items, \$208,323.98—see contra).....		208,323.98
Prepaid rentals, interest, insurance, etc.....		690,181.46
		\$93,619,018.20
CAPITAL AND LIABILITIES.		
Capital stock (par value \$100 per share):		
First preferred (7 per cent cumulative)		
Authorized and issued....	\$25,000,000.00	
Less—redeemed.....	1,216,200.00	
		\$23,783,800.00
Second preferred (8 per cent cumulative)		
Authorized \$25,000,000.00 issued.....	14,233,000.00	
Reserved for issue to employees on partial payment subscriptions.....	767,000.00	
		15,000,000.00
Common, authorized \$50,000,000.00 issued.....	20,466,800.00	
		\$93,619,018.20

Current liabilities:		
Purchase accounts and acceptances payable..	\$5,687,407.36	
Sundry other accounts payable.....	1,432,045.71	
Balance unpaid for United States Liberty Loan bonds.....	571,500.00	
Accrued first preferred dividend.....	138,738.84	
Second preferred dividend payable Nov. 1, 1918.....	253,791.21	
		8,083,483.12
Reserves:		
For doubtful accounts (current)—see contra.....	231,445.30	
For doubtful accounts (suspended assets)—see contra.....	208,323.98	
For insurance on branch stocks.....	31,335.82	
For depreciation of plant.....	5,096,473.90	
		5,567,579.00
Surplus, subject to Federal taxes for the year.....		20,717,356.08
		\$93,619,018.20

All of the officers and directors of the company have been re-elected for the ensuing year.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

THE rubber factories in Boston and vicinity have slowed up more or less in the last month of the year. The cancellation of government contracts has been one cause, and another is that many factories choose the last week or two of the year to make changes and repairs, or add new equipment, and to take the annual inventory. The opinion generally expressed is, that while it may take a little time for business to readjust itself from war to peace conditions, the rubber trade promises to be prosperous during the year just opening.

The Boston Rubber Shoe Co. is enlarging its working force, taking on all its old employees who are returning from service in the Army here or abroad. Having been released from government contracts, the factories are now employed entirely on civilian goods, and are making large tickets every day. Both factories shut down the last two days of December for inventory and repairs, to open promptly January 1 with a full force, and, presumably, business enough ahead to keep that force busy the entire coming season.

There was held in this city December 30 a general convention of the foremen of the Footwear Division of the United States Rubber Co., calling together the officers of that division of the company's interests, and the superintendents and foremen of the several factories where footwear is made. The convention was held during the day in the auditorium of the City Club, about 500 being present. In the evening a banquet was held at the Hotel Somerset, when an orchestra composed entirely of men from the National India Rubber Co., Providence, furnished the music. The hall was gaily decorated with bunting, the flags of the Allies, and the insignia of the company. Charles B. Seger, the newly elected president of the company; Homer E. Sawyer, vice-president in charge of the Footwear Division, and Myron H. Clark, general factory footwear manager, were among the speakers.

William J. Gallagher, expert plantation adviser of the United States Rubber Co. and former Director of Agriculture in the Federated Malay States, addressed the Brockton, Massachusetts, Commercial Club Saturday evening, December 14, on "Cultivating Rubber in the Middle East."

Frederick C. Hood, of the Hood Rubber Co., Watertown, presided at the third annual meeting of the Associated Industries of Massachusetts, held in this city November 26. The following resolution was adopted:

Resolved, That the Associated Industries of Massachusetts, representing more than one thousand industrial concerns in the Commonwealth, believing that those who, in time of public danger, gave up their places to serve the country and who wore its uniform should have the preference in private employment upon

being discharged from public service; and recognizing the obligation of the managers of industry to promote and safeguard the health, comfort and welfare of the workers, pledge this association to use its best endeavors to secure those results.

At the evening meeting, which assumed the character of a Victory Rally, Vice-President Thomas R. Marshall, Major-General Clarence R. Edwards and Howard Cooley, former vice-president of the association, and now vice-president of the Emergency Fleet Corporation, were the principal speakers. Music was furnished by the United States Aviation Band.

At the annual meeting of the Employment Managers' Association of this city, Fred S. Sparrow, formerly with the Hood Rubber Co., Watertown, was elected vice-president. Ralph G. Wells, of the E. I. du Pont de Nemours Powder Co., president of the National Association, was one of the speakers. He outlined the policy and program of the organization to develop and strengthen existing local associations, and to assist in the formation of others. The readjustment of employment methods to meet the coming needs, and the trade tests applied to those called to the colors, were subjects of other addresses.

Mr. Sparrow, mentioned above, for six years employment manager, has severed his connection with the Hood Rubber Co., and is succeeded by Herbert L. Baxter, formerly assistant manager of the cutting room. The employment manager's position with this company is one of unusual importance, as the company hires its workmen not only in the rubber industry, but in many lines of labor in the building trades, doing its own work of this kind instead of having such work done by contract.

The gross sales of the Boston Woven Hose & Rubber Co. in its fiscal year ended September 1 last totaled \$10,200,000, an increase of 30 per cent over the 1916-17 figure of \$7,800,000, and by far the largest twelve months' business in the history of the company. A goodly portion of this business was for government account but, being in the company's regular lines, did not entail rearrangement of plant or equipment to any great extent. The signing of the armistice found the company with no large army orders on hand, however. It still has contracts for furnishing goods to the Navy which will not be cancelled.

The national interest in canning and preserving food during the year stimulated the demand for jar rubbers and this resulted profitably for the Boston Woven Hose & Rubber Co. The sales for the year ending September 1 totaled nearly 4,000,000 gross or nearly 10,000,000 pounds of rubber rings. The company makes public no income account, but from the balance sheet it would appear that net earnings last year approximated \$1,000,000 after depreciation, taxes and other property setups. At the close of business September 1, the company had net quick assets of \$3,175,000, or approximately \$500,000 more than the working capital of the previous year.

It is reported that Albert H. Hadley, of the Chemical Research Co., of Lynn, has discovered and perfected a substitute for rubber cement, the result of fifty years' investigation of cements. His family was among the first people in the country to make rubber cement.

Boston imported crude rubber to the value of \$2,550,124 in the year ended September, 1918, as compared with \$920,040 for the corresponding period in 1917. The exports of manufactured rubber goods for the same periods were \$1,166,482 for 1918 and \$1,212,560 for 1917.

ANNUAL S. A. E. MEETING.

The annual meeting of the Society of Automotive Engineers will be held in the Engineering Societies' Building, West 39th street, New York City, February 4-6, 1919.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

THE year 1918 closes with the several plants constituting the rubber industry of Rhode Island being operated at the same capacity-breaking schedule that has been the record for nearly four years. Although there has been considerable cleaning up on government contracts and sub-contracts within the past month or six weeks, no anxiety has been caused as to the prospects of plenty of work for an indefinite period among the rubber workers, as all the mills are so far behind on regular goods that it will take many months to overtake the normal demands.

The New Year finds a great change in the labor situation that is one of the chief topics of interest among the manufacturers of all lines throughout the State. Up to within a few weeks there has been the same persistent and insistent demand for labor that has prevailed during more than four years. At the present time there appears to be more men seeking positions than there is demand for. The result is that manufacturers, planning for the reconstruction period, are able to be more selective in taking on additional help.

All of the rubber concerns of Rhode Island have materially improved their plants and facilities during the past year, and a number have plans now perfected for a further expansion and improvement. Changing conditions will, it is believed, afford them the desired opportunity of carrying to a successful termination certain plans which, in a number of instances, have been under consideration for a long time. Not only has considerable attention been given to the increasing of the facilities of productiveness in the factories, but the health, welfare and comfort of the employees—individually and collectively—have been looked after in a manner never before equalled in the industrial history of this section.

Plant extensions of the United States Rubber Company furnish convincing proof of the belief of its officials that pneumatics are to be the truck tires of the future, and that the demand for solid tires will be less and less, even for heavy hauling purposes on big trucks. By the end of January, the new tire plant of this company, at Providence, Rhode Island, will probably be completed. It will employ 5,000 men and will be capable of turning out \$20,000,000 worth of solid and large pneumatic tires annually. Further expansion calls for the building of a new cord tire unit in addition to the plants at Providence and Detroit, Michigan, the location of which has not yet been determined.

The plant of the National India Rubber Co. at Bristol is the scene of continual activity because of the improvements that are constantly being made. Not only are there numerous additions, alterations and renovations in progress all the time but many new and novel innovations for the comfort and betterment of the employees are being introduced. Everything possible for the health, safety and general welfare of the operatives is being done by the management, one of the latest acquisitions along this line being the holding of dental clinics, plans for which are now being carefully worked out. The employees are to benefit by the plan, as attention will be given to employees' teeth without delay whenever necessity arises. A dentist will devote regular hours at a room which is now being fitted up for the purpose, and emergency cases will be immediately looked after. Should an employee's teeth require more attention, the patient will visit the dentist at his local office.

The company is also engaged in the preliminary work of organizing a band of 35 pieces, the company to provide the instruments, and the band to be under the direction of a leader who is to arrange for meetings for practice at certain periods each week.

Women employees of the National company have entered into

a series of weekly military drills at the De Wolf Inn. A number of the women who board at the Inn, which is conducted by the corporation, began the drills some time ago and upon their invitation many of the other women are joining their ranks.

Douglas Morey, who has been head of the planning and industrial relations departments of the National company, succeeds H. W. Brown, recently resigned, as head of the employment bureau. The three departments have been consolidated.

Many of the hands released from other manufacturing plants in Bristol recently, owing to the curtailment on orders, are securing employment at the factory of the National India Rubber Co.

The National company closed its entire plant at Bristol on December 27 for the annual taking of stock. The mill, in which 4,500 hands are employed, is scheduled to resume operations on January 3.

The American Electrical Works, manufacturers of insulated wire, etc., at Phillipsdale, in East Providence, are planning a number of improvements in connection with their power distribution service, a contract having already been awarded to construct an intake pipe of reinforced concrete, 300 feet in length and 30 inches in diameter. The engineers in charge of the work have recently completed a study of the company's power plant with a view to offering recommendations as to additional units or changes necessary for increased efficiency. A new centrifugal pump with a capacity of about 1,800 gallons per minute is to be installed and the construction of a pump-house is proposed, the engineers being engaged at present in drawing the plans for this building, which will be of brick, one story, about 20 by 20 feet. Further improvements in the near future are forecasted.

The Woonsocket Rubber Co. has opened its restaurant for employes at its Millville plant and catered to 200 on the first day and over 225 on the next. The restaurant is modernly equipped and the excellent menu is in charge of an experienced chef, assisted by an able corps of attendants. The food is sold practically at cost. In the first of the company's restaurants, which was opened several months ago at the Alice Mill, Woonsocket, more than 300 persons are catered to daily. Hot meals are appreciated at both places.

A permit has been granted by the Inspector of Buildings to the Bourn Rubber Co. for the erection of a one-story brick-and-concrete structure on Warren street, Providence. It will be 90 by 60 feet and is to be used for storage purposes.

An addition is being erected on Hemlock street to the plant of the Revere Rubber Co., that will be one story high, and about 120 by 32 feet. It will be practically of steel construction and is intended for manufacturing purposes.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

THE signing of the armistice was quickly followed by orders to cease manufacturing war material. Trenton rubber manufacturers were ordered to continue work on only such goods as were already in process. The Empire Rubber and Tire Co. and the Acme Rubber Manufacturing Co. are completing such orders. The Essex Rubber Co. had a large contract for gas-masks, but the work was quickly stopped. The United & Globe Rubber Manufacturing Cos. are working on a large government order for fire hose. This order was not cancelled.

Trenton rubber manufacturers announce that the tire business is not as prosperous as during the summer, and that this is not unusual at this season of the year. They predict a boom in the tire and tube line after the first of January. Meanwhile the plants are kept busy on other lines of work.

The corporate name of the city is to be changed from "The Inhabitants of the City of Trenton" to "City of Trenton."

E. B. Knowles has been appointed general sales manager of the Thermoid Rubber Co., Trenton. He succeeds the late Harold F. Blanchard, whose portrait and obituary notice appeared in THE INDIA RUBBER WORLD for November 1, 1918.

Practically every rubber-manufacturing concern in Trenton has informed the Federal-State-Municipal Employment Agency that it will give the returning soldiers and sailors their former positions. Arrangements have been made to reemploy all of those disabled in service in such a way that by providing mechanical or other aid they can be made self-supporting.

At the annual meeting of the Trenton Rubber Manufacturers' Association, which comprises the Trenton, Wilmington and Philadelphia districts, the following officers were elected: John A. Lambert, president, Acme Rubber Manufacturing Co.; John S. Broughton, vice-president, United & Globe Rubber Manufacturing Cos.; Robert J. Stokes, secretary, Thermoid Rubber Co.; Alfred Whitehead, treasurer, Whitehead Brothers. The board of directors decided to contribute \$100 semi-annually towards the support of the Trenton Day Nursery. The association contributes to various other charitable institutions.

William E. Sanders, publicity man for the Essex Rubber Co., recently gave an address on "Rubber" before the Trenton Kiwanis Club.

The Delion Tire & Rubber Co. has nearly completed a two-story all-steel structure 40 by 100 feet to be used as a core room.

The Thermoid Rubber Co. has completed an eighty-foot addition, two stories high, at a cost of \$36,000.

The Joseph Stokes Rubber Co. has installed a modern fire-fighting system providing an ample water supply throughout its plant. The new equipment will reduce insurance rates considerably.

Charles E. Stokes, vice-president of the Home Rubber Co., has been made chairman of the committee to unite all the civic clubs of Trenton having for their object the publicity, progress and prosperity of the city.

The Hamilton Rubber Co. is erecting a one-story manufacturing building to be used as a kiln plant. The structure will be brick, 28 by 41 feet, and will cost \$2,500.

C. Edward Murray, Jr., second vice-president of the Empire Rubber & Tire Co., and Mrs. Murray have returned from White Sulphur Springs, West Virginia.

The employes of the Ajax Rubber Co., Inc., are perfecting plans for the organization of a patriotic and benevolent association.

Edgar H. Wilson, president and general manager of the Dural Rubber Corp., has proposed that a landing field for freight and passenger airplanes be established in Trenton, and has taken up the matter with the Trenton Chamber of Commerce. Mr. Wilson has a wide knowledge of aircraft parts, particularly those made of rubber. He holds twenty-two patents on aircraft parts and has been consulted by representatives of several foreign governments relative to the rubber parts for planes controlled by him and the Dural company, and which have been extensively used by the United States Government. At the Flemington, New Jersey, plant of the company more than 100,000 parts for aircraft have been manufactured.

Among manufacturing concerns in Trenton that have agreed to form War Savings Stamps societies among employees are the following: Ajax Rubber Co., Inc.; United & Globe Rubber Manufacturing Cos.; Home Rubber Co.; Empire Rubber & Tire Co.; Woven Steel Hose & Rubber Co.; Thermoid Rubber Co.; Essex Rubber Co.; and John A. Roebling's Sons Co.

The Federal Tire & Accessory Co., Wrightstown, suffered a fire loss estimated at \$2,500, not covered by insurance, on December 19. The cause was spontaneous combustion.

Charles J. and Aaron A. Moulds, formerly in the employ of the Thermoid Rubber Co. and the Ajax Rubber Co., Inc., respectively, recently spent furloughs with their parents. Both are sailors, the former on the U. S. S. *Rhode Island* and the latter on the U. S. S. *Adams*.

The Epworth League of the Clinton Avenue Methodist Church conducted a rubber social on December 20, the price of admission being a piece of rubber.

CANADIAN NOTES.

The Advisory Council for Scientific Industrial Research has recommended to the Canadian Government to establish at Ottawa a central research institute with the function of a bureau of standards, with a view to establishing standards of measures and materials used in various industries. Manufacturers of rubber goods would benefit equally with other industries by the services of such an institution.

W. Binmore, the retiring treasurer of the Dominion Rubber System, Montreal, Quebec, was given a complimentary dinner at the Ritz-Carlton by his associates prior to his departure for California. R. E. Jamieson, director of sales, presided, and addresses were made by T. A. Rieder, president of the company, and Messrs. Jamieson, Eden, Allan, Thornton, J. M. S. Carroll, and Lieutenant-Colonel Massie. Mr. Binmore was presented with an illuminated address, and with fitted traveling bags for both himself and Mrs. Binmore.

The Oak Tire and Rubber Co., Limited, has removed its head offices from Oakville, Ontario, to 19 Dundas street, East, Toronto, Ontario.

The Hercules Rubber Co., Limited, Brampton, Ontario, is completing its new factory building for the manufacture of all kinds of rubber goods. Machinery, including large horse-power motors, is being purchased and will be installed at an early date. The first line of products will be automobile tires, tubes, and accessories. A. Brown is the secretary and treasurer of the company.

K. & S. Canadian Tire & Rubber Co., Limited, 527 Yonge street, Toronto, Ontario, a recently organized concern whose incorporation was noted in our columns November 1, 1918, will expend \$250,000 in making additions to its plant at Weston. This will cover its requirements in the way of new machinery. Building operations at this point, however, will not commence until early spring.

The Kaufman Rubber Co., Limited, Kitchener, Ontario, won the first honor flag in Kitchener for securing subscriptions to the recent Victory Loan from more than 75 per cent of its employees. The objective was \$26,000 and the amount actually subscribed totaled \$50,300, which was obtained on the second day of the campaign. To this was added \$215,000 subscribed by the company, making the total more than a quarter of a million dollars.

A bequest of \$2,000 has been made to Bishop's College, Lennoxville, Quebec, Canada, in memory of Lieutenant F. Reginald Robinson, who was killed in action on August 19, 1916. He was the son of W. H. Robinson, former president of the Dominion Rubber System.

HUGO WELLEIN.

HARD and conscientious work, beginning at the bottom and going up the ladder round by round, is the record of Hugo Wellein, the recently elected treasurer of the Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada, whose portrait is here presented.



HUGO WELLEIN.

He was born June 21, 1883, at Bridgeport, Ontario, near Kitchener, and began his education in the public schools there. This was followed by three years at Kitchener Collegiate, supplemented by a business course. Starting as office boy with the Berlin (now Kitchener) Rubber Manufacturing Co., where he remained four years, he was appointed accountant to the secretary-treasurer of the Merchants' Rubber

Co., Kitchener, in 1904. Six years later he entered the general sales department of the head office of the Canadian Consolidated Rubber Co., Limited, at Montreal. In February, 1913, he became office manager to the manager of the Middle West Division of the company, with headquarters at Winnipeg, Manitoba, and after four years there was appointed manager of the Quebec Division. A year later he became general auditor, and in October was elected to his present position. Thus, for his entire business life of 19 years, he has worked continuously for one concern, for the other companies mentioned all merged to form the present Canadian Consolidated Rubber Co., Limited.

Mr. Wellein is very popular and is held in high regard by all those with whom he is associated in business. He is receiving many congratulations on his recent appointment.

NATIONAL ASSOCIATION OF WASTE MATERIAL DEALERS MEETS.

The quarterly meetings of the National Association of Waste Material Dealers at the Hotel Astor, New York, December 17 and 18, 1918, were well attended. It developed at the meeting of the Scrap Rubber Division, under the chairmanship of David Feinburg, that the Rubber Reclaimers' Division of The Rubber Association now admits that the one-half-cent handling clause of the new scrap rubber packing specifications is undesirable. Freight classification and a possible inspection service for rejected material were discussed. It was also learned that arrangements had been made with the Interstate Commerce Commission to the effect that auto tires may be tied with four ropes, if packages tied with rope and wire are treated alike.

THE CAMERON MACHINE CO., 57 POPLAR STREET, BROOKLYN, New York, has opened a new office in Cincinnati, Ohio, at 503 First National Bank Building. It is fully equipped with samples of the company's line and is intended for a service station as well as a sales office.

"Rubber Machinery," by Henry C. Pearson, is filled with valuable information for rubber manufacturers. Price \$6.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

WRITING, as I do, with the sounds of revelry and bell-ringing in my ears, on an occasion which need not be specifically mentioned, it is not particularly easy to compose one's thoughts to the somber routine of writing on purely trade matters. This, however, is all I am entitled to do in these columns, and the first matter which inevitably comes to mind is the effect that the welcome cessation of hostilities will have on those hives of industry, the rubber works.

That there must be a transition period of general upset goes without saying, but anything like stagnation to follow the cessation of war demands is most unlikely, owing to the deflection of stocks of all sorts of rubber goods in general civilian use. The rubber trade being concerned with equipment, its products will be wanted for some time, as there is no question of an immediate demobilization, though naturally the rush of work to get out orders has subsided and there will be no occasion for overtime. I suppose that manufacturers, especially proofer^s, would welcome a more sudden change from war to peace conditions, so that they could tackle their civilian trade, as this would be far more profitable than government work, which is now all done on a strictly cost basis and yields only a fair—perhaps some would call it an unfair—profit. No very rapid change could, however, be made all around, as so much of the cloth in stock has been woven and dyed for government purposes, and it would be quite unsuitable for the civilian trade.

THE RAW RUBBER POSITION.

With regard to raw rubber, it is generally thought that there will be no return, for some time at any rate, to the two shillings per pound figure. I gather that the bulk of the stocks held by manufacturers was bought at 2s. 4d. or 2s. 5d. a pound, the demand having been largely satisfied before the fall to 2s. per pound. As a manufacturer said to me: "All of us are not extremely wealthy men, nor do we want to buy for too far ahead, so there was no rush to buy rubber at 2s." Certainly, if there had been, the price would at once have gone up in accordance with customary market procedure. If the rubber-growing interests could have foreseen the present condition of affairs they would not have asked for a government committee, which has got to work just as a general feeling is making itself articulate in the country to get back to self-management.

TESTING RAINPROOF CLOTH.

At the meeting of the Manchester section of the Society of Chemical Industry, on November 8, a paper on this subject was given by Dr. G. Martin and James Wood. Dr. Martin said that the want of a rapid standard method had been felt in recent times when large quantities of material had to be reported upon quickly. He gave a short account of the various methods of rainproofing with aluminum acetate, gelatine, paraffin wax, etc., and emphasized that such goods, unlike rubber goods, are permeable to air, and, except in the case of wax, to a more or less extent to water. They are popular because they were more healthy than rubbered goods and will always be in demand, he thought, for town use, where shelter from heavy rain is always at hand. After describing Gawalowski's waterproof testing apparatus, he then described the War Office drop test, which is a simple form of apparatus and allows results to be obtained rapidly by a process which imitates the natural fall of rain on the cloth. Drops of water are allowed to fall on a piece of the cloth which is laid on blotting paper on a sheet of glass placed at an angle of 45 degrees. The observer watches the glass from behind, and when water is seen on the blotting paper the number of drops of water is noted by the burette

reading. The results of many tests were given by Dr. Martin, variation as wide as 6 and 18 drops being noted on the same piece of cloth.

In the subsequent discussion it was urged by two or three speakers that to take the mean of such divergent figures as the result of a test was a very unscientific proceeding. Dr. Martin, however, maintained that though the test was not all that it might be, it still gave very useful results, and, at any rate, was much superior to the dash test and the trough test commonly used in the trade. Mr. Terry said that it was obvious that such a test would not be of any service in the case of rubbered goods in which the government relied upon the number of grains of proofing contained on a certain superficial. He also remarked that inequalities of spreading are a common feature in rubbered goods and suggested that Dr. Martin might look into this matter in the case of showerproofings, as it might explain the wide variation in the figures he had given. In the course of his remarks Mr. Terry referred to the humorous skit which appeared in the September number of *THE INDIA RUBBER WORLD*, the recital of the dialogue between the British and American soldier regarding the latter's rainproof causing considerable amusement. Dr. Martin said that so far he had not tackled the question of rubberproofings, but it was his intention to do so.

DETERMINATION OF LAMPBLACK IN RUBBER.

I see that a method for effecting this has been communicated to the Rubber Section of the American Chemical Society by A. M. Smith, of the Bureau of Standards. I have seen only a short abstract of the method, which consists of the removal by solvents and nitric acid of all substances which would change weight on ignition, and estimation of the carbon by the loss on heating. It is stated that the method is found sufficiently accurate for commercial work when a small correction is made to provide for the errors of the determination. I may say that over 20 years ago I worked out a method on very similar lines, though I have never ventured to return my results as more than a fair approximation. A good deal depends upon the nature of the lampblack. I remember saying something about my method to C. O. Weber and he threw cold water on it by saying that lampblack was considerably attacked by strong nitric acid. Presumably it would be mainly the hydrocarbons in the oily blacks that would be attacked rather than the free carbon, of which the American gas blacks are mainly composed. At this juncture, then, if nitric acid is used in the process, it would be more nearly correct to refer to the determination of free carbon than of lampblack in rubber.

A rubber tire with a large amount of gas black is, of course, a simpler problem to tackle than is a common-grade mixing with a few per cent of inferior black, and I have had in my experience rubber samples in which I have found it impossible to obtain a figure in which I had confidence. With a high-grade simple mixing, however, I can quite support the claim that the method as outlined will give most useful results, and especially in cases where the lampblack used is of a standard quality as to specification.

WASTE RUBBER SALVAGE.

A notice recently appeared in the press that by arrangement with the government departments concerned, national collection of waste rubber was to be undertaken with the object of benefiting the funds of the Red Cross. I have not been able to get any details of the project and find that in reclaiming circles it is looked upon as one more of the many brilliant ideas which have been launched during the progress of the war with the same laudable object in view. Certainly one of the difficulties in the

way of waste rubber collection is that the articles are scattered in units all over the country, and of course if delivered by individuals at some central depots it would certainly get over the important item of cost of collection. It is probable, however, now that peace is in sight, that we shall not hear any more of the project.

TIRE SPECIFICATIONS IN AMERICA.

The specifications for pneumatic tires and tubes adopted by the Motor Transport Corps and given in the October number of *THE INDIA RUBBER WORLD* have been read with much interest on this side. The allowance of sulphur being 8 per cent, calculated on the rubber present, is generally considered an improvement on the 5 per cent usually enforced in European specifications for government rubber goods of much the same quality. The lower limit of sulphur, where it is rigidly adhered to, generally means either that an amount of time is necessitated for the cure, which is detrimental to the rubber, or that various accelerators have to be used.

Those manufacturers who saw the specifications for waterproof garments in which oil substitute and reclaimed rubber were allowed up to a certain figure, and who thought that this sort of thing was general, will note that substitutes and reclaimed rubber are barred by the specifications under notice. Reclaimers who were inclined to be jubilant over the waterproof specifications have had their spirits somewhat dampened, as many of them hold that tire covers can contain reclaimed rubber to advantage. This bar to its use certainly cannot fail to harden the hearts of those responsible for specifications in Europe just at a time when signs of yielding to the seductive influence of reclaimers were apparent. No doubt a prominent factor in the prohibition of reclaimed rubber is the impossibility of estimating its amount by analysis, though for the matter of that it is no easier to say whether the "best wild or plantation rubber" has been used throughout.

The clause which states that if mineral matters containing sulphur are used, a sample of the unvulcanized rubber must be submitted for analysis, is presumably connected with the now general use of lithopone, which contains sulphur both as sulphide and sulphate. The clause is one which might be copied elsewhere with advantage as tending to reduce the complications and tediousness of analysis.

FRENCH EXPORT PROHIBITION LIFTED.

The "Journal Officiel," Paris, for October 29, 1918, announces a ministerial decree permitting henceforth the exportation from France, without special authorization, of rubber goods, other than sheets, vulcanized or not, and drainage tubes and gloves for surgical purposes.

BRITISH GOVERNMENT CONTROL OF RUBBER.

In view of the changed conditions, the whole question of government control of the output and selling price of plantation rubber has been reconsidered by the Council of the Rubber Growers' Association (Incorporated), and the following resolutions have been agreed to:

In view of the cessation of hostilities, the gradual introduction thereupon of peace conditions, and in view of the long delay that experience has shown to be inseparable from attempts to put into practical working any scheme of government control, this council instructs its representative on the government committee dealing with the matter to withdraw all proposals for the government control of the rubber-producing industry, but trusts that he will continue to remain a member of the advisory committee and give his valuable help to the industry.

In view of the indication by various bodies in the East of their approval of the control of the rubber output, and of the opinion of this council that control, on a voluntary basis, is most desirable if it can be made effective, the Output Control Committee be requested at once to draw up a scheme and submit it to the Council, when, if approved, an endeavor can be made to obtain sufficient support to it to make it effective.

The representative of the Rubber Growers' Association has placed its views before the Government Committee, and it is understood that no further immediate steps will be taken by that committee in the direction of establishing any government control of the rubber-growing industry.—"Financial Times," London.

THE TIRE TRADE IN JAPAN, CHINA, AND HAWAII.

Clincher types are most easily obtained in Japan, but straight-side types may be secured through American companies. The one tire factory now established in the Empire is building clincher tires exclusively, but, seeing the probability that in the future straight-side tires will be demanded, has equipment ready to build this style on short notice. Under present conditions, clincher tires assist in selling a car, as most dealers in Japan desire cars fitted with clincher rims and shipped without tires.

The bulk of the replacement business in Japan falls to the Dunlop company, allied with the British company of the same name, working with British and Japanese capital, and maintaining a large factory at Kobe, which makes soft bead tires only, but produces many other kinds of rubber goods. Its business extends throughout the Far East and as far south as Singapore, and it does an immensely larger trade in jinrikisha tires than in auto tires, as there are only five or six thousand autos in all China and Japan, while there are hundreds of thousands of jinrikishas, practically all of which are provided with pneumatic tires.

Black tops for autos meet the demand in Japan, although an option of either black or khaki is appreciated. The climate generally does not go to extremes of hot or cold, so the materials used in standard production in the United States will meet every requirement.

Although the first autos appeared in China in 1901, there are less than 3,000 in the whole Republic to-day, the reason being the impossible roads. At the present time most of the auto tires used in China are standard American makes, but several of the leading European tire makers were represented in China before the war, and will doubtless go after the business again when conditions become normal. Tire prices in China are high as compared with those in America, being affected by freight, duty and exchange.

In the Hawaiian Islands there are more autos than in Japan and China combined, and sales are increasing rapidly on account of the phenomenal prosperity the Islands have been enjoying for several years past. The market for tires is identical with that in the United States for an equal number of cars, say about 6,000. ("Motor Vehicles in Japan, China and Hawaii." Special Agent Series No. 170, United States Department of Commerce.)

A ROYAL RUBBER OFFICE IN HOLLAND.

The Minister of Agriculture, Industry and Commerce has established a Royal rubber office, which is located at 100 Zeestraat, The Hague. G. I. de Vries, former chief of the rubber department of the Netherlands Overseas Trust Co., is the director of the new office. The activities of the Royal office for bicycle tires have been transferred to the new office; the former tire office goes out of existence. L. C. Steffelaar, director of the former tire office has been honorably discharged. The advisory committee of the former tire office will henceforth act in connection with the Royal rubber office.

NATIONALIZATION OF THE RUSSIAN RUBBER INDUSTRY.

The whole of the rubber manufacturing industry in Russia has now been nationalized and is controlled by a body styled the Administrative Department of State Rubber Works, under a decree issued by the Russian National Economic Council, says the "India Rubber Journal," which adds that no private trade connections abroad are to be permitted, and that all such contracts already made are cancelled.

Spanish Market for Rubber Goods.

Special Correspondence.

SPAIN to-day looms up to the American rubber manufacturers as virgin ground for the sale of their products. Before the war 90 per cent of the rubber goods used in Spain were furnished by the Continental-Caoutchouc & Gutta Percha Co., Hanover, Germany; the Prowodnik Rubber Co., Riga, Russia; Michelin & Co., Clermont-Ferrand, France; Pirelli & Co., Milan, Italy, and the Dunlop Rubber Co., Limited, Birmingham, England, and it is safe to say that of the above companies the Continental-Caoutchouc & Gutta Percha Co. of Germany furnished the largest percentage of goods.

Now it will be some time before Germany will be a strong competitor in the manufacture of rubber goods, since nearly all her rubber factories have been stripped and dismantled for war purposes, and, moreover, Germany has practically no crude rubber on hand. During the war she paid unheard-of prices for contraband rubber, which was smuggled into the country by her submarines, and now that the war is over the crude rubber needs of the other countries will be first considered in order to replenish their home requirements for rubber goods. The United States should avail herself at once of the opportunity to put not only rubber but every product into Spain by means of able representatives and good management.

Spain to-day is practically clean of rubber goods and only those of inferior make are obtainable and then at very high prices. The classes of rubber goods most needed at the present time are pneumatic and solid tires, druggists' sundries, hose, packing and a full line of footwear, as well as soles and heels.

There is no doubt that American goods if properly pushed will forge ahead, and Spain will become one of our largest rubber goods consumers, and the same can be said of all South American countries that were formerly supplied for the greater part by Europe.

It should be understood that, although Germany has sent no rubber goods into Spain since the war started, she kept her organizations in Spain at work compiling statistics on the rubber trade, and the Germans know the situation better to-day than we do ourselves. One good point to consider is that some of our products would have to be changed to a certain degree, such, for example, as solid tires, as the road conditions of Spain are very bad and the foreign rubber companies' engineers have made a study of these and supply a solid tire to meet the unusual conditions.

Although there is at the present time a large factory being installed in Spain, practically all of the crude materials must be obtained from abroad and it will be some time before the Spanish labor will become proficient enough to compete with our skilled workmen, therefore "Made in the United States" on any product in Spain to-day is a decided advantage.

In this connection it is interesting to note that the Neumáticos Nacional Sociedad Anónima (National Pneumatic Co.), Bar-

celona, Spain, will add a full line of solid-tire and boot and shoe equipment to that already installed. Although this company was financed entirely by Spanish capital, the factory is supplied throughout with American equipment, installed according to American practice, therefore the products will be like those made in the United States.

The entire installation and construction of the factory were achieved with Spanish labor that had never seen rubber machinery, and while the Spanish laborers are not as expert as Americans they are steady and willing. Great hardships were encountered in procuring pipe, pipe fittings, valves and all such material, as Spain imports all supplies of this nature from other countries and on account of the war it was almost impossible to obtain the necessary supplies to work with. For instance, two-inch pressure pipe was selling for \$5 a yard and all valves had to be cast and made specially to order,

costing five times what they would cost in normal times.

French rubber experts who have visited the factory and examined all the American equipment very closely, say it is one of the best-equipped and most up-to-date rubber factories in Europe.

This will be the first rubber mill in Spain to manufacture all kinds of rubber goods, there being at this time only a few very small factories making specialties.

The factory is 1,000 by 500 feet, built on the one-story plan, and so constructed that additional units can be added whenever needed. It is situated on the Cardona river, 50 miles north of Barcelona, so that water power will be used to generate the electricity necessary in operating the plant.



CARDONA RIVER DAM UNDER CONSTRUCTION.

THE FAR EASTERN RUBBER CRISIS.

THE rubber situation in the Straits Settlements and Federated Malay States, together with the report of the recently appointed rubber commission, as published in the "Straits Budget," is briefly as follows:

For a while restriction of output had been considered, but then came the recognition of the fact that such restriction without accompanying increase of price would render the producer's position worse, not better. So thought was given to the rate of depletion of pre-restriction stocks and the balance between restricted production and restricted consumption.

PRICE CONTROL.

The commission considers that as artificial restriction of rubber consumption is being met by artificial restriction of production, there must be price control, three courses seeming to be open. The first is control of price by prohibiting export of rubber sold at less than a minimum price, the second is an imperial monopoly in rubber under the control of a rubber trust, the third is control of price by government buying at a minimum price.

IMPERIAL MONOPOLY.

It is doubted whether the first course would afford the assistance that appears to be required, but the commission strongly recommends the second course, imperial monopoly with a rubber trust, to the consideration of the British Government. Each British rubber-producing country would enter the trust to the extent of its restricted output. Holland could be allowed to join the trust. Each country would buy its entire output. The rubber thus bought might be dealt with on joint account, or on separate account, as might be most convenient. The trust would fix the buying and selling prices from time to time and arrange on a pro-rata basis of the output for the allocation of the orders.

If the output of the Federated Malay States was reduced to, say, 46,000 tons a year, and if the buying price was £260 a ton (equivalent to 2s. 4d. a pound), a capital of £11,196,000 would buy up the whole year's output. But such an amount would not be necessary, for the stock would be turned over.

GOVERNMENT CONTROL.

If it is decided not to form an imperial rubber trust, the commission holds that the government (the imperial or local) should be willing to adopt the third course, and buy rubber of a specified grade at a specified price, to be modified from time to time, in accordance with varying factors, when there are no other buyers at that price.

RUBBER GROWERS' ASSOCIATION SUGGESTS MINIMUM PRICES.

The Rubber Grower's Association suggests the following present minimum prices per pound, ex-warehouses, in the Eastern markets at port of shipment: first crêpe, fair average quality, 2s. 3½d.; ribbed, smoked sheet, fair average quality, 2s. 3d.; first crêpe, off quality, 2s. 3d.; ribbed, smoked sheet, off quality, 2s. 2d.; clean, light brown scrap crêpe, 2s. 1½d.; clean, medium brown scrap crêpe, 2s. 0½d.; specky, medium brown scrap crêpe, 1s. 11½d.; dark to black scrap crêpe, free from heat, 1s. 10½d.

COST OF PRODUCTION.

The cost of production is shown in the following statement, sent in to the commission from 193 estates, which have been divided into classes "A" and "B" estates, whose f. o. b. cost of production does not exceed 45 cents per pound in class "A," other estates in class "B." The monetary figures are in Straits Settlements currency, one dollar being equal to 56.7 cents United States currency.

Class.	A. Acres Rubber in Bearing.	B. Crop Secured to End June (6 Months). Pounds Rubber.	C. Average Yield per Acre per Annum. Pounds Rubber.	D. General Charges. Cents per Pound.	E. Up-Keep of Bearing Area. Cents per Pound.	F. Tapping and Curing. Cents per Pound.	G. Packing and Despatch. Cents per Pound.	H. Export Duty and War Tax. Cents per Pound.	I. F. O. B. Cost Excluding F. Lbs. per Acre.	J. F. O. B. Cost Restricted to 200 Cents per Acre.	K. Percent-age increase in F. O. B. Cost.
"A" Class, 107 estates...	110,578¾	16,838,783½	304	14.98	6.77	14.31	2.25	2.21	35.31	45.06	27.61
"B" Class, 86 estates...	74,802¾	9,370,128½	250	16.68	13.59	21.26	2.30	2.33	58.83	61.40	14.06
193 estates	185,381¾	26,208,912	283	14.07	9.81	17.41	2.27	2.27	43.56	54.00	22.92

Note.—Export duty and war tax have not been included in the f. o. b. cost, either unrestricted (G) or restricted (H).

The f. o. b. cost is reckoned without export duty, war tax, local freight, insurance, Singapore selling charges, depreciation, head office charges or directors' fees. The lowest f. o. b. cost, thus reckoned is 20.4 cents, and the highest, 78.29 cents. The cost for one estate is below 25 cents a pound; for 33 estates, over 25 cents and under 35 cents; for 73 estates, over 35 cents and under 45 cents; for 48 estates, over 45 cents and under 55 cents; for 24 estates, over 55 cents and under 65 cents; for 11 estates, over 65 cents and under 75 cents; for three estates, over 75 cents.

SUMMARY OF REPORT.

The following is a summary of report of Rubber Industry Protection Commission:

1. Existing stocks plantation rubber in United States of America, United Kingdom, British Malaya, and Netherlands East Indies estimated at 148,620 tons.

Returns of stocks in Continental Europe, Japan, Canada, Australia, Ceylon not available.

2. Production of 1917 was 200,000 tons. Even if output of 1918 and 1919 does not exceed this, it amounts to 400,000 tons for those two years.

Estimated consumption plantation, 1918, 150,000 tons; 1919, 117,000 tons.

Apart from existing stocks, therefore, production of 1918 and 1919 will meet consumption of 1918, 1919 and 1920 without touching 1920 crop.

3. Restriction of output plantation rubber therefore necessary as soon as possible, as temporary measure during present period artificially reduced consumption.

4. It is recommended that British and Dutch governments agree to restrict by law their output for a period to be determined later by mutual agreement. Output of Indo-China practically negligible.

5. Flat rate of 50 pounds an acre of tappable rubber for first period of three months is recommended, being at rate of 200 pounds per annum. It may be necessary to reduce this later.

6. System of licenses for estates and coupons for small holdings elaborated in detail and recommended.

7. Recommended that imperial trust be formed by governments of British and Dutch rubber-producing countries, with monopoly of buying and selling for period mutually agreed upon. In respect of rubber produced during restriction of output, price to be paid for first latex sheet or pale crêpe (f. a. q.) one dollar, Straits Settlements currency per pound, ex-warehouse Singapore.

8. If trust not approved, there should be a minimum price, and government of each country should buy output if market price does not exceed minimum price.

9. Minimum price 80 cents Straits Settlements currency recommended for qualities above mentioned.

10. For lower qualities valuations would be made by Standard Qualities Committee to be appointed for that purpose in Singapore.

11. Control should be in hands of Rubber Controller, with residence in Singapore. He should be assisted by advisory committee. There should be under him deputy rubber controllers in Malaya, Ceylon and India, with local advisory committees.

There should be independent rubber controller in Netherlands East Indies, working in conjunction with him. Any order varying rate of restriction of output or buying price if there is a trust, or minimum price, would be made by British and Dutch controllers in agreement.

12. All rubber-consuming countries should be asked to pass their orders to rubber controller for allocation or else allocate the orders themselves and report particulars thereof to Rubber Controller.

13. Actual buying, selling and storing rubber can be carried out

by firms now engaged in trade under supervision of deputy rubber controllers.

14. Whether there is trust or minimum price, it is recommended that government should offer to purchase at equitable price stocks of good-quality rubber produced before restriction comes into force, and still remaining in Straits Settlements and Malay States. Quantity of good-quality rubber in Straits Settlements and Malay States estimated at about 25,000 tons.

In conclusion our contemporary points out that, although the war is ended, for a time there will be an increased, not a decreased, demand for shipping on the Atlantic, since America will have to repatriate millions of men as well as to send urgently needed food to Europe. If one reason for the restriction of rubber imports was to force shipping from the Pacific to the Atlantic, we may be quite sure that the need of it there will be as great in 1920 as it is at present, so that the rubber industry has to prepare for a period during which the conditions to be faced will be altogether abnormal.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED OCTOBER 15, 1918.

- N**O. 1,281,264. Demountable wheel rim. Z. C. Angevine, Long Beach, Calif.
 1,281,273. Rubber tread for boots and shoes. F. Berenstein, Chelsea, Mass.
 1,281,364. Airless tire with rubber core. H. S. Hawks, Kansas City, Mo.
 1,281,469. Tire-tube-repairing kit. G. B. Wood, Detroit, Mich.
 1,281,476. Rubber tread for boots and shoes. G. M. Anderson, Washington, D. C.
 1,281,526. Calipers for pneumatic tires. H. E. Curtis, Dayton, O., assignor to The B. F. Goodrich Co., New York City.
 1,281,554. Balloon window. J. R. Gammeter, Akron, O., assignor to The B. F. Goodrich Co., New York City.
 1,281,557. Hose. H. W. Goodall, Alden, Pa.
 1,281,558. Armored pneumatic tire. W. O. Gottwals, Washington, D. C.
 1,281,601. Reinforcement of tire bases. G. H. Lewis, assignor to The Fisk Rubber Co.—both of Chicopee Falls, Mass.
 1,281,890. Demountable wheel. I. M. Alguire, Riverside, Calif.
 1,281,893. Rubber and asbestos shoe for pneumatic tires. L. E. Bacon, Estelene, Colo.
 1,281,937. Ether-mask. E. Gamble, Waverly, N. Y.
 1,281,975. Improvements in life-saving garment. R. J. Kee, Toronto, Ont., Canada.
 1,281,979. Vehicle wheel with pneumatic tire on felloe. W. P. Keogh, Brooklyn, N. Y.
 1,282,000. Intravenous-injection apparatus. J. H. Quayle, Cleveland, O.

ISSUED OCTOBER 22, 1918.

- 1,282,182. Anti-skid chain for twin tires. L. Brook, Brighthouse, Eng. Grove, Tex.
 1,282,197. Tubeless tire, rim and lock therefor. F. B. Cumpston, Blooming Grove, Tex.
 1,282,258. Rubber-shoe last having wooden core with metallic surface. M. M. Merritt, Danvers, assignor to Copper Products Co., Boston—both in Mass.
 1,282,260. Rubber-shoe last with metallic reinforcing strip at top and electrolytically deposited hollow shell, etc. M. M. Merritt, Danvers, assignor to Copper Products Co., Boston—both in Mass.
 1,282,274. Rubber heel construction for boots or shoes. N. H. Morozowicz, Bellevue Borough, and J. R. A. Farr, Ben Avon Borough—both in Pa.
 1,282,350. Anti-slipping device combined with rubber heel. H. H. Wood, Oyster Bay, N. Y.
 1,282,362. Rim-demounting wheel for motor vehicles. E. K. Baker, assignor to Baker Wheel & Rim Co.—both of Chicago, Ill.
 1,282,397. Stiffened-rubber shoe-sole. H. C. Egerton, Passaic, N. J.
 1,282,398. Rubber shoe-sole with interlocking stiffener. H. C. Egerton, Ridgewood, N. J.
 1,282,399. Stiffener for rubber shoe-sole. H. C. Egerton, Ridgewood, N. J.
 1,282,400. Interchangeable reinforced rubber shoe-sole. H. C. Egerton, Ridgewood, N. J.
 1,282,427. Resilient wheel-tire. F. I. Johnson, assignor to Johnson Pneumatic Tire Co.—both of Fitchburg, Mass.
 1,282,428. Resilient tire for vehicles. F. I. Johnson, assignor to Johnson Pneumatic Tire Co.—both of Fitchburg, Mass.
 1,282,441. Corset with elastic straps. J. Leopold and M. Beberfeld, New York City.
 1,282,457. Two-part wheel rim for tires. B. J. Oltmanns, Peoria, Ill.
 1,282,468. Device for maintaining a tight in flexible electrical connections. G. L. Scheel, Chicago, Ill.
 1,285,511. Ink-tablet holder for fountain pens. J. Williams, Abergelle, and L. T. Jones, Old Colwyn—both in Wales.
 1,282,527. Life-preserver. G. Bidonde, New York City.
 1,282,569. Truss. A. T. Gookin, Cambridge, Mass.
 1,282,584. Elastic attachment for shoes to prevent scar on hosiery. M. W. Hunter, Washington, D. C.
 1,282,586. Belt of leather and elastic webbing cemented together. J. Jacobs, assignor to The Live Leather Belt Co.—both of New York City. (Original application divided.)
 1,282,611. Cushion wheel. J. W. Martin, Pittsburgh, Pa.
 1,282,651. Waterproof-fabric tire protector. W. L. Stuyveson, St. Louis, Mich.
 1,282,690. Inner tube for tires. J. H. Hamlin, Winston-Salem, N. C.
 1,282,692. Resilient tire. A. G. Hoegren, Chicago, Ill.

ISSUED OCTOBER 29, 1918.

- 1,282,980. Pneumatic mattress. N. M. Takach, Bridgeville, N. Y.
 1,283,033. Solid elastic tire. J. M. Avery, Dallas, Tex.
 1,283,064. Resilient tire. J. W. and G. F. Burgess, Kansas City, Mo.
 1,283,065. Inner tire-cushion. J. W. and G. F. Burgess, Kansas City, Mo.
 1,283,095. Toy balloon. F. A. Cumiskey, St. Louis, Mo.
 1,283,260. Thermostat. H. D. Montgomery, Brooklyn, N. Y.

THE DOMINION OF CANADA.

PUBLISHED AUGUST 31, 1918.

- 185,906. Life preserver. M. Baron, Newark, N. J., U. S. A.
 185,922. Hydrometer. E. Edelmann, Chicago, Ill., U. S. A.
 185,942. Life preserver. D. D. Lyons, Farmington, Minn., U. S. A.
 185,971. Toy boat operated by rubber bands. O. E. Wall, Honolulu, Hawaii.
 186,009. Elastic foot-arch and ankle support. H. A. Bernstein, New York City, U. S. A.
 186,018. Inflatable tourniquet. C. F. Dorsey, Iroquois Falls, Ont.
 186,037. Waterproof life-saving suit. R. J. Kee, Toronto, Ont.
 186,039. Combined rubber crutch-tip and anti-slipping device. T. J. LeCras, Toronto, Ont.
 186,077. Life-saving garment. Safe on Sea, Limited, assignee of J. E. Lepage—both of Montreal, Que.
 186,125. Hot-water bag for leg-bathing. A. Marion, Estevan, Sask.
 186,135. Pneumatic wheel. E. C. McCarty, Littleton, Ill., U. S. A.
 186,151. Teeth and mouth-cleaner. M. I. Schamberg, New York City, U. S. A.
 186,258. Hot-water bottle. G. M. Scott, née Adams, Scott's Mills, Ore., U. S. A.

PUBLISHED SEPTEMBER 30, 1918.

- 186,569. Rubber surgical appliance. H. A. Dygert, Philadelphia, Pa., U. S. A.
 186,581. Diving suit. H. Houdini, New York City, U. S. A.
 186,586. Armored pneumatic tire. I. L. Leo, Toronto, Ont.
 186,644. Laminated shoe-tread of fabric and rubber. L. F. Montgomery, Fort Recovery, and J. E. Grosjean, Lima, assignee of one-half interest—both in Ohio, U. S. A.
 186,663. Life-saving apparatus. E. Hanz and D. Brody, co-inventors—both of Boerne, Texas, U. S. A.

THE UNITED KINGDOM.

ISSUED NOVEMBER 6, 1918.

- 118,840. Artificial leg with rubber pad between toe and body of foot. E. Sauze, 5 rue de la Prefecture, St. Etienne, Loire, France.
 118,859. Parachute. E. R. Calthrop, Eldon Street House, Eldon street, London.
 118,860. Spring device of rubber strands, for parachute. E. R. Calthrop, Eldon Street House, Eldon street, London.
 118,868. Pneumatic-sucker support for ship-repairing apparatus, etc. R. H. Quine, Thirlmere House, Frizington, Cumberland.

ISSUED NOVEMBER 13, 1918.

- 119,121. Pneumatic tire. A. A. Crozier, 3 Woodquest avenue, Herne Hill, London.
 119,146. Double or triple detachable tire rims. T. J. Hobson, 17 Chain Walk, Aston, Birmingham.

ISSUED NOVEMBER 20, 1918.

- 119,194. Reinforcing fabric insertion for tires. A. S. Burdick, 4457 West Washington Boulevard, and J. C. Hermann, 2848 Wilson avenue—both in Chicago, Ill., U. S. A.
 119,277. Inflatable bathing suit. A. J. Wakeford, Stirling Lodge, Stonebridge Park, Middlesex.

ISSUED NOVEMBER 27, 1918.

- 119,361. Valves for respirators. E. Kummant, 5 Kasanskaia street, Petrograd, Russia.
 119,386. Brush handle provided with one or more suction cups for attachment to wash basin or other surface for use by one-handed person. C. T. Maw and Maw, Son & Sons, 7 Aldersgate street, London.
 119,410. Rubber saddle in shock-absorbing bearing for artificial limb. E. Smith, 124 St. Stephens Green West, Dublin.
 119,488. Latex-cup support and spout. Kapoewas Rubber Co., 30 Moor-gate street, London. (W. F. Adolphy; Kapoewas Rubber Co., Pontianak, West Borneo.)

ISSUED DECEMBER 4, 1918.

- 119,566. Artificial foot and leg connected with rubber cylinder. J. Wyllie, Kershaws Engineering Works, Nelson, New Zealand.
 119,587. Gas mask. E. Kummant, 5 Kasanskaia street, Petrograd, Russia.
 119,595. Latex-spout and cup support with cover for cup. Kapoewas Rubber Co., 30 Moor-gate street, and W. H. Hartley, 7 Sherwood street, Piccadilly Circus—both in London.
 119,602. Rubber buffers in protective armor for ships. W. Plasecky, 563 Main street, Cambridge, Mass., U. S. A.
 119,617. Capsule closure with rubber gasket. W. R. Pike, Jericho, Long Island, N. Y., U. S. A.

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION).

- 487,382. (November 2, 1917.) Improvements in fountain pens. W. T. K. Calton.
 487,494. (November 9, 1917.) Expandable wheel rim for automobiles. J. H. M. Michon.
 487,524. (November 12, 1917.) Fountain pen. Ramel & Co.
 487,905. (December 8, 1917.) Life-saving jacket. C. Châléat, 9 rue Pasteur, Suresnes, Seine.

- 488,043. (December 18, 1917.) Rubber tire. F. F. Green.
 488,050. (December 19, 1917.) Nipple for feeding bottles. F. R. Graham-Yooll.
 488,097. (October 26, 1917.) Life-saving costume. Kalfon Pimienta and J. Pelloisini.
 488,162. (December 26, 1917.) Suspenders. J. Coste-Floret.
 488,257. (January 3, 1918.) Rubber tire for vehicle wheels. H. L. Harding.
 488,258. (January 3, 1918.) Impermeable and resilient belts of web or fabric taking place of leather belts. M. Asipoff.
 488,329. (December 19, 1917.) Resilient wheel without pneumatic tire. C. Dagradi.

NEW ZEALAND. ISSUED OCTOBER 31, 1918.

- 40,158. Hypodermic injector with rodless piston of rubber. R. G. J. McEntire, 23 Pembroke Park, Dublin, Ireland.
 40,507. Billiard-table cushion-support. F. A. Alcock, 155 Elizabeth street, Melbourne, Victoria.

TRADE MARKS.

THE UNITED STATES.

- N**O. 105,529. The words RED JACKET—jar rings. United States Rubber Co., New York City.
 107,861. The word SPEEDWELL—shoes and boots of leather, canvas, rubber and fiber. R. C. H. Covington Co., Richmond, Ky.
 110,383. The word "USCO" in script letters quoted—boots and shoes wholly or partly of rubber, and rubber heels. United States Rubber Co., New Brunswick, N. J., and New York City.
 111,232. Representation of a shield upon which is superimposed a double outlined triangle with a pair of scales within and the letters G and H to the right and left of the apex—boots and shoes of leather, textile fabrics, rubber or felt, and soles of leather, textile, and rubber. Von Der Heyde & John, New York City.
 111,483. Representation of a Maltese cross bearing the words TOP NORCH and the representation of a deeply notched tree-trunk—rubber boots and shoes of all kinds, insoles, spats, and over-pairs made of a combination of rubber and cotton or wooden fabric. The Beacon Falls Rubber Shoe Co., Beacon Falls, Conn.
 111,554. The words RUB and GLU respectively above and below the letter "R"—compound for coloring rubber, and rubber preservative. F. W. Tunnell & Co., Inc., Philadelphia, Pa.
 112,242. The word RUSCO—woven fan-belts. The Russell Manufacturing Co., Middletown, Conn.
 112,563. Representation of an elephant coming through a cross-section of a tire—rubber tires for vehicles. Farley & MacNeill, Boston, Mass.
 112,966. The word ALLIED in script letters—men's shoes of leather and leather substitutes. Elbert S. Torrey, Boston, Mass.
 112,989. Representation of coins falling out of an open money-bag outlined against a black disk—boots and shoes of leather, canvas, or fabric. W. H. McElwain Co., Boston, Mass.
 113,063. An outlined geometric figure—mechanical rubber goods including rubber and fabric hose, packing, tires, inner tubes, and rubber belting. New Jersey Car Spring & Rubber Co., Inc., Jersey City, N. J.
 113,064. The word CARSPRING—mechanical rubber goods including rubber and fabric hose, packing, tires, inner tubes, and rubber belting. New Jersey Car Spring & Rubber Co., Inc., Jersey City, N. J.

THE DOMINION OF CANADA.

- 23,722. Representation of a star—billiard and pocket-billiard balls. The Brunswick-Balke-Collender Co., Chicago, Ill., U. S. A.
 23,731. The letters T and G—engine packings and mechanical rubber goods. Thomson-Gordon, Limited, Hamilton, Ont.
 23,757. The word SHELLBAC and the representation of a turtle—rain-coats. Hubert Douglas Groves, 15 Station Road, Huddersfield, Yorkshire, England.
 23,774. The letters B. B. C.—billiard and pocket-billiard balls. The Brunswick-Balke-Collender Co., Chicago, Ill., U. S. A.
 23,811. The words KOR-KER—puncture sealing compositions for pneumatic tires. Puncture Cure Sales Co., Newark, N. J., U. S. A.
 23,866. Representation of the head and shoulders of a gladiator with Roman helmet—rubber belting, hose, packings, mechanical rubber goods, automobile and motorcycle tires and accessories, bicycle tires or rubber bicycle materials, and rubber boots and shoes. Gutta Percha & Rubber, Limited, Toronto, Ont.

NEW ZEALAND. TO AMERICANS.

- 14,714. Representation of a kneeling monkey chopping off end of tail on jar labeled MOCO MONKEY GRIP, beside the name of the concern and beneath the words: "It's a long tale, but I'll cut it short. Moco Monkey Grip is the best"—self-vulcanizing cold patch of rubber for automobile and motorcycle inner and outer tubes and casings. Moco Laboratories, Inc., 9 South Dewey street, Oklahoma City, Okla., U. S. A. (A. C. Wilshire, 219 Clarence street, Sydney.)
 14,715. Representation of two monkeys swinging from the first and last letters of the word MOCO above them, with the words MONKEY GRIP beneath. Same as No. 14,714.

THE FRENCH REPUBLIC. TO AMERICANS.

- 25,650. The word RALSTON pierced from left to right by an arrow—shoes of leather, fabric, cloth, and rubber. Churchill & Alden Co., Brockton, Mass., U. S. A.
 25,658. Representation of a tire through which is thrust an arm and hand wearing a rubber glove, the hand holding a surgeon's knife—rubber heels, soles, and tires. The Miller Rubber Co., Akron, O.
 25,659. Representation of conventionalized Brownie-type mermaid figure in outline, with the words BETTY WALES—rubbers, shoes, waterproofs, etc. Goldman Costume Co., 16 West 33d street, New York City, U. S. A.
 25,687. The word RINEX—soles of rubber, fiber, or other materials for boots, shoes, and the like. United States Rubber Co., 1790 Broadway, New York City, U. S. A.
 25,688. The word SPRING-STEP—rubber heels for boots and shoes. Revere Rubber Co., 335 Valley street, Providence, R. I., U. S. A.

TO CANADIANS.

- 25,637. Representation of seal of Dominion Rubber Co., Limited—goods made wholly or partly of rubber or of rubber combined or mixed with other materials, such as rubber shoes, tires, tubes, waterproof fabrics, gloves, belts, balls, balloons, druggists' sundries, mechanical goods, etc. Dominion Rubber Co., Limited, Montreal, Que., Canada.
 25,638. Same as No. 25,637.
 25,639. Representation of an anchor and the words ANCHOR RUBBER Co. within a circle of rope—rubber goods same as No. 25,637. Canadian Consolidated Rubber Co., Limited, Montreal, Que., Canada.
 25,640. The words FLEET FOOT—rubber goods same as No. 25,637. Canadian Consolidated Rubber Co., Limited, Montreal, Que., Canada.
 25,641. Representation of a flying eagle with the words GOODYEAR'S RUBBERS above and below, respectively—rubber goods same as No. 25,637. Canadian Consolidated Rubber Co., Limited, Montreal, Que., Canada.
 25,642. Representation of seal of Canadian Rubber Co. of Montreal over the words TRADE MARK and JACQUES CARTIER—rubber goods same as No. 25,637. Canadian Rubber Co. of Montreal, Limited, Montreal, Que., Canada.
 25,643. Representation of a maple leaf bearing the words THE MAPLE LEAF BRAND—rubber goods same as No. 25,637. The Maple Leaf Rubber Co., Limited, Port Dalhousie, Ont., Canada.
 25,644. Representation of crossed snow-shoes with superimposed shield bearing the words GRANBY RUBBER Co., LIMITED—rubber goods same as No. 25,637. Granby Rubber Co., Limited, Granby, Que., Canada.
 25,645. Representation of head of moose over the words THE MERCHANTS RUBBER Co., LIMITED—rubber goods same as No. 25,637. The Merchants Rubber Co., Limited, Kitchener, Ont., Canada.

DESIGNS.

THE UNITED STATES.

- N**O. 52,568. Hose. Term 14 years. Patented October 15, 1918. B. V. Hallgreen, Trenton, N. J.
 52,569. Hose. Term 14 years. Patented October 15, 1918. B. V. Hallgreen, Trenton, N. J.
 52,570. Hose. Term 14 years. Patented October 15, 1918. B. V. Hallgreen, Trenton, N. J.
 52,571. Hose. Term 14 years. Patented October 15, 1918. B. V. Hallgreen, Trenton, N. J.
 52,573. Resilient tire. Term 14 years. Patented October 15, 1918. H. H. Hewitt, Buffalo, N. Y.
 52,582. Corset. Term 14 years. Patented October 15, 1918. A. Malsin, assignor to Lane Bryant, Inc.—both of New York City.
 52,594. Wheel with twin tires. Term 14 years. Patented October 15, 1918. G. Walther, Dayton, O.
 52,616. Hot-water bottle, syringe bag, etc. Term 14 years. Patented October 29, 1918. T. W. Miller, assignor to The Faultless Rubber Co.—both of Ashland, O.



52,573

THE DOMINION OF CANADA.

- 4,447. Golf ball. Patented August 20, 1918. Canadian Consolidated Rubber Co., Limited, Montreal, Que.

CEYLON RUBBER EXPORT TAX REDUCED.

Ceylon companies have for some time past been taxed to the amount of 7½ rupee cents per pound of rubber. Following the change of policy in Malaya, the Ceylon Government has now decided to reduce this tax to one of three rupee cents per pound. The old tax meant 1¼d. per pound, and the concession is a welcome one, particularly in connection with the elimination of the war risk insurance on cargoes.

THE RECONSTRUCTION CONFERENCE.

THE Reconstruction Conference of the Industrial War Service Committee called by the Chamber of Commerce of the United States, held at Atlantic City, New Jersey, the first week in December, brought delegates from nearly 400 industries to consider the present industrial situation, and readjustment upon a peace basis. Between 3,000 and 4,000 business men were present to take part in the deliberations.

The business of the convention was greatly facilitated by dividing the various industries into 35 related groups and afterward assembling these into ten major groups, combining and representing the ten leading industries.

SUBJECTS PRESENTED AND RESOLUTIONS PASSED.

The scope of the convention, which lasted four days, can best be appreciated by the subjects of the resolutions presented by the clearance committee and unanimously adopted at the closing session. These included: the cancellation of war contracts, distribution of surplus government supplies, removal of restrictions on industry, development of pivotal industries, industrial cooperation, filling of vacancies on Federal Trade Commission, industrial relations, relocation of labor, development of public work, readjustment of taxation, provision for shrinkage of values in inventories, return to owners of railroads, against government ownership of telegraphs, telephones and cables, the construction of a great merchant marine, development of port facilities, investigation of public utilities, development of hydro-electric power on waterways, common service of ocean tonnage to secure to all nations their immediate needs for food, raw materials and transportation of their products, appointment of a commission to visit Europe to study reconstruction needs, and to be available to the peace delegates of the United States for any needed information relative to the industries, government encouragement of the development of foreign trade, closer relations with South American countries, protection of property rights of Americans in Mexico, provision of educational facilities to prepare young men for foreign commerce, maintenance of forest products laboratories, uniform system of cost accounting, council and trade committees to coordinate with the various war service committees, organization of a representative association in each industry, to be a member of the National Trade Association.

GROUP 20—THE RUBBER INDUSTRY.

The rubber industry was assigned to Group 20, which included also saturated and coated textiles and allied products. It held two meetings, both of which were presided over by Frank A. Seiberling, president of the Goodyear Tire and Rubber Co., Akron, Ohio. Representing the industry were the following:

Bruce Bedford, Luzerne Rubber Co., Trenton, New Jersey;
E. B. Brinkerhoff and T. B. Coughlin, British-American Manufacturing Co., New York City;
I. W. Curtis, A. G. Spaulding & Bros., New York City;
Harry T. Dunn, The Fink Rubber Co., Chicopee Falls, Massachusetts;
S. H. Dodd, Vulcanized Rubber Co., New York City;
Harvey S. Firestone, Firestone Tire & Rubber Co., Akron, Ohio;
George E. Hall and J. W. Fellows, Boston Woven Hose & Rubber Co., Cambridge, Massachusetts;
G. B. Glaesner, American Hard Rubber Co., New York City;
M. L. Heminway, secretary War Service Committee of the Rubber Industry;
I. W. Maguire, Brunswick-Balke-Collender Co., New York City;
C. W. Seiberling and D. R. Stevens, The Goodyear Tire & Rubber Co., Akron, Ohio;
R. H. Sotherland, Mansfield Tire & Rubber Co., Mansfield, Ohio;
F. E. Titus, The B. F. Goodrich Co., New York City;
H. Weida, India Rubber Co., New Brunswick, New Jersey, and
W. M. Milner, secretary.

THE MEETING OF GROUP 20.

Mr. Seiberling in his address commented upon several subjects which were to be considered at the conference, most of which are included in the above list of resolutions.

J. W. Curtis, of A. G. Spaulding & Bros., addressed the meeting on the injustice of taxing rubber-soled tennis shoes, golf-balls and other sporting goods at higher rates than articles of luxury.

Alvan Hunsicker, vice-president of the Standard Oil Co.,

New York City, called attention to many points which were later made subjects of the general resolutions. On some of these general discussion followed.

W. H. Manss of the War Service Committee made a brief address, and after the appointment of a committee on resolutions the meeting adjourned.

RESOLUTIONS OF THE RUBBER AND ALLIED INDUSTRIES GROUP.

At the second meeting of Group 20 the committee on resolutions presented the following:

NO. 1—COMMITTEE OF BUSINESS MEN TO EUROPE.

WHEREAS, The deliberations of the Peace Conference may develop questions which will involve the welfare of American industries, and
WHEREAS, There is apparently no provision made by the Government to have present in Europe a delegation of representative American business men, therefore be it

RESOLVED, That it is the sense of this meeting that a delegation of representative American business men be sent to Europe to volunteer their assistance to the United States Peace Commission.

NO. 2—FINANCING FOREIGN SALES.

WHEREAS, It is apparent that in exploiting export business it is necessary to provide for an adequate system of financial credits, therefore be it

RESOLVED, That the proper agencies of the Government be urged to investigate the fiscal methods practiced by the Governments of other nations with which American industries must compete, and that there be established facilities for meeting competitive business in foreign markets on an equal footing.

NO. 3—TAXATION.

WHEREAS, The scheme of taxation in the revenue law about to be enacted contemplated a very extraordinary and possible increasing expense for an indefinite period on the part of the Government, and

WHEREAS, Under continued war conditions it would have been wise to have raised a large sum by direct taxation, and

WHEREAS, On account of the close of the war the amount needed by the Government will be much less than contemplated, and

WHEREAS, The amount that will be needed can approximately be determined, therefore be it

RESOLVED, That any scheme of taxation should embody provisions for the distribution of the amount necessary for governmental current requirements over a sufficient length of time to avoid an undue assessment on business at this time and that the present excise tax operative under clause 600 of the existing law as well as the proposed excise tax to be levied under clause 900 of the proposed bill be eliminated and that the burden of taxation in so far as the income tax feature is concerned be more widely extended on a basis that will be fair and equitable to all.

NO. 4—MINIMUM AND MAXIMUM PRICES.

WHEREAS, The Government in order to help win the war was compelled as a war measure in the face of a rapidly advancing market, to fix a maximum price on certain raw materials and finished products, and

WHEREAS, Upon the signing of the armistice the large governmental demand was suddenly removed, thereby creating a condition that threatens abrupt liquidation with a possible drastic decline in values, therefore be it

RESOLVED, That we urge upon the proper governmental agencies the establishment of a fixed minimum price on all such materials on which a maximum price has been fixed and that these fixed prices be revised periodically until such time as values are reached more nearly on a pre-war basis.

NO. 5—GOVERNMENT MATERIALS ON HAND.

WHEREAS, The sudden release of materials now held by the Government purchased for war purposes beyond the military requirements for the immediate future would seriously dislocate many lines of business by forcing upon the market a volume of materials and supplies far beyond the needs of the consuming public during the readjustment period, therefore be it

RESOLVED, That it is the sense of this meeting that the Government hold these materials in storage for a sufficient length of time to permit those industries which were engaged in the manufacture of war munitions to readjust their business more nearly to a pre-war basis and that the ultimate release of these materials and supplies be made in installments covering a reasonable period of time so as not to disturb the stability of the market and that these materials and supplies when offered for sale should first be offered to the sources of supply which furnished them, and that any surplus not taken in this manner be disposed of through the recognized distributors of such materials and supplies and not by public auction or other dumping methods.

NO. 6—HIGHWAYS.

Highway improvement is of such vital importance to the welfare of the nation that we urge the immediate creation of a separate and distinct Federal Highways Commission whose duty it shall be to construct and maintain a system of National Highways and that appropriations be made therefor.

NO. 7—CRUDE RUBBER.

WHEREAS, The rubber industry is among the largest industries of the United States, and

WHEREAS, This industry is entirely dependent upon foreign markets for its supply of crude rubber and accordingly its expansion and its possibility of competing in the export trade of the world is entirely at the mercy of the economic policy of these foreign governments, be it

RESOLVED, That we urge that no export tax be placed against crude rubber discriminating against the United States which if imposed would cripple the rubber manufacturing industry and wholly exclude the United States from competing in the export trade of the world. Be it also further

RESOLVED, That some guarantee shall be given by all foreign governments owning or controlling the supply of crude rubber, that manufacturers of rubber goods in the United States shall be able to obtain their supplies of crude rubber upon as favorable terms as the manufacturers of all other countries.

Significantly enough, when these resolutions came up in Major Group No. 5, Resolution No. 7, relating to crude rubber, was tabled, the others passing, with slight modifications.

Review of the Crude Rubber Market.

NEW YORK.

QUIETNESS characterized the market for the first half of the month, although there was a fair demand from manufacturers. Spot offerings were light, and the market tone was firm. At the middle of the month the announcement was made that all restrictions upon the quantities of crude rubber that may be imported from overseas were at an end and that import licenses would henceforth be granted regardless of quantities involved. It was also learned that the government option prices were withdrawn and that no undertaking as to maximum values would be required in the future.

Consumers have shown little interest in the situation, buying only small quantities. During the second half of the month there was very little stock of any kind on the spot, and, in fact, no island coarse, caucho ball or cameté at all. Manufacturers will hardly be in the market for appreciable quantities for the next two weeks at least.

The report that the Netherlands East Indies Government had placed an embargo on rubber and jelutong exports from the Dutch East Indies was without foundation, but the exports have been placed under government regulations.

On December 20, restrictions as to the quantity of balata, gutta percha, gutta siak, and jelutong for shipment from overseas were removed. Official option prices were withdrawn and from now on no undertaking as to maximum prices will be needed. The only restrictions abolished are those affecting shipments from primary or overseas markets. Applicants for import licenses will, however, still have to conform to the other existing import regulations.

PLANTATIONS.—On December 1, latex was 63 cents and ribs were 61½ cents. Quotations, for arrival, were, on December 26, 1918: latex, 54 cents; ribs 52½; January-February shipments, latex, 52 cents, ribs 51 cents.

PARÁS.—On December 26, prices were: upriver fine 61 cents (a month ago 66 to 68 cents); upriver coarse, 35½ cents (a month ago 38 to 40 cents); upper caucho ball, 35 cents (a month ago 38 to 40 cents); cameté, 24 cents (a month ago 26 to 28 cents).

NEW YORK SPOT QUOTATIONS.

Following are the New York spot quotations, one year ago, allocation and free rubber prices a month ago and spot prices on December 26:

PLANTATION HEVEA—	Spot. Jan. 1, 1918.	Allocated. Dec. 1, 1918.	Free. Dec. 1, 1918.	Dec. 26, 1918.
First latex crépe....	55 @	54 @	61½ @	54 @
*Hevea first crépe....	47 @	52 @	57 @	48 @
Amber crépe No. 1....	46 @	47 @	56 @	47 @
Amber crépe No. 2....	45 @	46 @	55 @	46 @
Amber crépe No. 3....	44 @	45 @	54 @	45 @
Brown crépe, thick clean	45 @	44 @	53 @	45 @
Brown crépe, thin clean	45 @	42 @	53 @	45 @
Brown crépe, thin specky	42 @	38 @	49 @	40 @
Brown crépe, rolled....	33 @	34 @	43 @	35 @
Smoked sheet, ribbed standard quality....	54 @ 54½	52 @	60½ @	52 @
*Hevea ribbed smoked sheets				
Smoked sheet, plain standard quality....	51 @	@	@	51 @
*Hevea plain or smooth smoked sheets				
Unsmoked sheet, standard quality....	49 @ 50	50 @	@	49 @
*Hevea unsmoked sheets				
Colombo scrap No. 1..	@	@	@	38 @
Colombo scrap, No. 2..	@	@	@	36 @

BRAZILIAN PARÁS—

Upriver fine	61½ @	58 @	64 @ 67	61 @
Upriver medium	56 @ 57	52 @	@ 39	55 @
Upriver coarse	41 @	34 @	38 @ 39	35½ @
Upriver weak fine....	50 @ 51	43 @	52 @	51 @
Upper caucho ball....	40½ @ 41	33 @	38 @ 39	35 @

	Spot. Jan. 1, 1918.	Allocated. Dec. 1, 1918.	Free. Dec. 1, 1918.	Dec. 26, 1918.
BRAZILIAN PARÁS—				
Islands fine	52 @	47 @	@	52 @
Islands medium	45 @ 46	42 @	@	45 @
Islands coarse	27 @	22 @	27 @	23½ @
Cameté	27 @	23 @	27 @	24 @
Lower caucho ball....	39 @	31 @ 34	@	34 @
Peruvian fine	58 @	@	@	**56 @
Tapajos fine	57 @ 58	55 @ 58	@	57 @

AFRICANS—

Niger flake, prime....	48 @	25 @	28 @	28 @
paste	@	@	@	24 @
Benguela, extra No. 1, 28%	@	30 @	33 @	**33 @
Benguela, No. 2, 32½% ..	@	26 @	29 @	**29 @
Congo prime, black } upper	50 @	45 @	@	**48 @
Congo prime, red upper Rio Nunez ball....	48 @	45 @	@	**48 @
Rio Nunez sheets and strings	@	@	@	**55 @
Conakry niggers	@	@	@	**55 @
Massai sheets and strings	@	@	@	**55 @

CENTRALS—

Corinto scrap	40 @	36 @	39 @	37 @
Esmeralda sausage ...	39 @ 40	36 @	39 @	36 @ 36½
Central scrap	37 @	35 @	39 @	35½ @ 36
Central scrap and } strip, 75 per cent. }	35 @	34 @	34 @ 35	33 @ 33½
Central wet sheet, 25% ..	26 @	@	@	26 @ 27
Gayule, 20% guarantee	27 @ 28½	26 @	32 @	34 @ 35
Guayule, dry	29 @ 30	35 @	35 @	40 @ 41

MANICOBAS—

Ceara negro heads....	35 @ 36	@	@	35 @
Ceara scrap	25 @ 26	@	@	35 @
Manicoba (basis 30% } loss washing and } drying)	33 @	@	@	**33 @ 34
Mangabeira thin sheet.	31 @	@	@	**34 @ 35

EAST INDIAN—

Assam crépe	46 @	@	@	36 @ 37
Assam onions	45 @	@	@	44 @ 45
Penang block scrap....	38 @	@	@	38 @ 42

BALATA—

Block, Ciudad Bolivar.	72 @	70 @	71 @	69 @ 71
Colombia	53 @	58½ @	60 @	58 @ 59
Panama	51 @	56½ @	58 @	57 @ 58
Surinam sheet	83½ @	@	95 @	93 @ 94
amber	@	@	@	95 @

PONTIANAK—

Banjermassin	13½ @ 14	@	@	14½ @
Palembang	@	@	@	14½ @
Pressed block	20½ @ 21	@	@	18½ @
Sarawak	@	@	@	@

GUTTA PERCHA—

Gutta Siak	21 @	@	@	23 @ 24
Red Macassar	2.50 @ 3.00	@	@	2.90 @ 2.95

*Rubber Association of America nomenclature.
**Nominal.

RECLAIMED RUBBER.

There was a little activity noticed in the reclaimed-rubber market during the first part of the month, but the volume of business was small. Following the armistice and the subsequent removal of restrictions on crude and manufactured rubber, there was even less interest shown in reclaims and the market became very quiet. This condition is apparent at the present time in all markets for rubber supplies, but the expectation of activity early in the year is confident in many quarters. The prices on standard reclaims has not changed materially since last month.

NEW YORK QUOTATIONS.

DECEMBER 26, 1918.

Subject to change without notice.

Standard reclaims:			
Floating	lb.	.35 @	.40
Friction	lb.	.35 @	.40
Mechanical	lb.	.12 @	.13
Red	lb.	.20 @	.25
Shoe	lb.	.15 @	.15½
Tire, auto	lb.	.17½ @	.18½
truck	lb.	.13 @	.13½
White	lb.	.24 @	.25

COMPARATIVE HIGH AND LOW RUBBER PRICES.

	December.			December.			December.	
	Spot.	Free.		Spot.	Free.		Spot.	Free.
Plantations:								
First latex crepe..	\$0.58 @ 0.54			\$0.59 @ 0.52 1/2				
Smoked sheet								
ribbed .....	.56 @ .52			.58 @ .50				
Paras:								
Upriver, fine ...	.63 1/2 @ .62	\$0.66 @ 0.61		.62 @ .57	\$0.81 @ 0.78			
Upriver, coarse..	.37 1/2 @ .36 1/2	.39 1/2 @ .38		.42 @ .37	.56 @ .47			
Islands, fine....	.54 @ .53	.57 @ .57		.51 @ .47	.72 @ .69			
Islands, coarse..	.24 1/2 @ .24 1/2	.25 @ .23 1/2		.26 1/2 @ .24 1/2	.34 @ .30			
Cameta .....	.26 @ .25	.26 @ .23 1/2		.26 1/2 @ .24 1/2	.36 @ .31			

WEEKLY RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [November 7, 1918]: The weekly rubber auction which commenced yesterday, saw a further substantial advance in the prices of all grades. In the earlier part of the sale spirited competition rushed the price for smoked sheet up to 67 1/2 cents (which is 4 1/2 cents above last week's best), but this figure was not maintained, the highest paid in the concluding stages being 66 cents. Fine pale crepe, of which there was again very little on offer, sold up to 71 1/2 cents, and closed at 70 1/2 cents. Clean brown and good dark crepes were in good demand and show an advance averaging 4 1/2 cents. Of 1,142 tons cataloged, only 595 tons changed hands, but this small sale is due not so much to a poor demand as to reluctance on the part of sellers to meet the variations of an erratic market.

The following was the course of values:

	In Singapore per Pound. ¹	Sterling Equivalent per Pound in London.
Sheet, fine ribbed smoked.....	65c @ 67 1/2c	1/11 1/4 @ 2/ 0 1/4
Sheet, good ribbed smoked.....	52 @ 64 1/2	1/ 7 3/4 @ 1/11 1/4
Sheet, plain smoked	55 @ 64 1/2	1/ 8 1/2 @ 1/11 1/4
Sheet, plain	50 @ 57 1/2	1/ 7 1/2 @ 1/ 9 1/4
Crepe, fine pale.....	66 @ 70 1/2	1/11 1/4 @ 2/ 0 1/4
Crepe, good pale	49 @ 64 1/2	1/ 6 1/2 @ 1/11 1/4
Crepe, fine brown	39 1/2 @ 47	1/ 4 1/2 @ 1/ 6 1/4
Crepe, good brown	30 1/2 @ 39	1/ 1 1/2 @ 1/ 4
Crepe, dark	27 @ 33 1/2	1/ 5 @ 1/ 2 1/2
Crepe, bark	19 @ 28 1/2	/10 1/2 @ 1/ 1
Scrap, virgin and pressed.....	19 @ 20	/10 1/2 @ /10 1/2
Scrap, loose	18 @ 24	/10 @ /11 1/4

¹Quoted in S. S. Currency.

PLANTATION RUBBER EXPORTS FROM JAVA.

To—	September.		Nine Months Ended September 30.	
	1917.	1918.	1917.	1918.
England	433,000	2,091,000	1,200,000	1,659,000
United States.....	823,000	200,000	1,093,000	5,047,000
Singapore	81,000	611,000	1,093,000	6,485,000
Japan .....	.....	11,000	.....	674,000
Australia	4,000	.....	20,000	.....
Other countries .....	.....	.....	.....	354,000
Totals	1,341,000	822,000	14,404,000	14,219,000
From—				
Batavia	598,000	326,000	8,344,000	7,508,000
Samarang	34,000	178,000	124,000	124,000
Soerabaya	703,000	264,000	5,635,000	6,349,000
Other ports	6,000	232,000	247,000	238,000
Totals	1,341,000	822,000	14,404,000	14,219,000

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

[The Figures Indicate Weight in Pounds.]

	Fine.	Medium.	Coarse.	Caucho.	Cameta.	Totals
NOVEMBER 1. By the <i>Maud Morey</i> , from Para.						
H. A. Astlett & Co.	52,000					52,000
NOVEMBER 11. By the <i>Nat. L. Gorton</i> , from Para.						
H. A. Astlett & Co.	32,000					32,000
DECEMBER 16. By the <i>George S. Smith</i> , from Para.						
H. A. Astlett & Co.	46,000					46,000
DECEMBER 16. By the <i>George S. Smith</i> , from Para and Manaoas.						
Meyer & Brown.....	181,440					181,440
DECEMBER 19. By the <i>Purus</i> , from Para and Manaoas.						
General Rubber Co.	407,680					407,680
DECEMBER 19. By the <i>Purus</i> , from Para and Manaoas.						
General Rubber Co.	840,000					840,000
DECEMBER 20. By the <i>Purus</i> , from Para and Manaoas.						
Poel & Kelly.....	236,000	41,300	23,400	52,600		353,300
DECEMBER 21. By the <i>Purus</i> , from Para.						
H. A. Astlett & Co.	435,000					435,000
DECEMBER 21. By the <i>Purus</i> , from Para and Manaoas.						
Meyer & Brown.....	297,920	26,880	22,400	78,400		425,600

ARRIVALS AT THE PORT OF NEW YORK.

PLANTATIONS.

	POUNDS.
NOVEMBER 22. By the <i>Langton Hall</i> , from Colombo:	
Poel & Kelly.....	57,100
DECEMBER 13. By the <i>Goentoe</i> , overland, from the Far East:	
J. T. Johnstone & Co.	3,300
DECEMBER 20. By the <i>Suki Maru</i> , overland, from the Far East:	
J. T. Johnstone & Co.	41,000

GUAYULE.

TO INDIANAPOLIS.

OCTOBER 31. All rail:	
Continental-Mexican Rubber Co.	65,850
NOVEMBER 25. By the <i>El Valle</i> , No. 289:	
Continental-Mexican Rubber Co.	65,950
NOVEMBER 30. By the <i>Oxaban</i> , No. 1:	
Continental-Mexican Rubber Co.	58,400
DECEMBER 3. All rail:	
Continental-Mexican Rubber Co.	70,000
DECEMBER 8. By the <i>San Marcos</i> :	
Continental-Mexican Rubber Co.	57,900
DECEMBER 12. All rail:	
Continental-Mexican Rubber Co.	80,100
DECEMBER 13. All rail:	
Continental-Mexican Rubber Co.	77,315

CRUDE RUBBER ARRIVALS AT PACIFIC COAST AS REPORTED.

PLANTATIONS.

AT SAN FRANCISCO.

	POUNDS.
DECEMBER 11. By the <i>Tokai Maru</i> , at San Francisco:	
Poel & Kelly.....	244,000
DECEMBER 14. By the <i>Siberia Maru</i> , from Singapore:	
Meyer & Brown.....	112,000
DECEMBER 16. By the <i>Siberia Maru</i> , from Singapore:	
General Rubber Co.	913,900
DECEMBER 20. By the <i>Rindjani</i> , from Batavia:	
Poel & Kelly.....	127,500
General Rubber Co.	972,400 1,099,900

AT SEATTLE.

NOVEMBER 15. By the <i>Kawi</i> , from the Far East:	
Poel & Kelly.....	58,500
NOVEMBER 21. By the <i>East Wind</i> , from Kobe:	
Poel & Kelly.....	47,000

ARRIVALS AT THE PORT OF NEW YORK.

PLANTATIONS.

	POUNDS.
DECEMBER 10. By the <i>Huahuu</i> , from Singapore:	
General Rubber Co.	448,000
DECEMBER 19. By the <i>Andes Maru</i> , from the Far East:	
Poel & Kelly.....	13,900

AT VANCOUVER.

DECEMBER 5. By the <i>Protesilaus</i> , from Colombo:	
Meyer & Brown.....	56,000
DECEMBER 10. By the <i>Tokai Maru</i> , from Singapore:	
Meyer & Brown.....	145,600
DECEMBER 15. By the <i>Huahuu</i> , from Singapore:	
Meyer & Brown.....	89,600
Poel & Kelly.....	17,850 107,450

CRUDE RUBBER ARRIVALS AT PACIFIC COAST AS STATED BY SHIP'S MANIFESTS.¹

SEATTLE AND TACOMA.

PLANTATIONS.

[Figured 180 pounds net to the case or bale.]

TO AKRON, OHIO.

	POUNDS.
DECEMBER 2. By the <i>Hakushika Maru</i> , from Singapore:	
Firestone Tire & Rubber Co.	957,780
DECEMBER 3. By the <i>Teesta</i> , from Singapore, via Kobe:	
Firestone Tire & Rubber Co.	564,480
DECEMBER 12. By the <i>Tokai Maru</i> , from Singapore, via Yokohama:	
The Goodyear Tire & Rubber Co.	455,400
Swinehart Rubber & Tire Co.	131,860 587,260

TO NEW YORK.

NOVEMBER 21. By the <i>East Wind</i> , from Kobe:	
International Trading Co.	81,720
Bousted & Co.	2,520
Alden's Successors, Limited.....	118,440
Frank P. Dow & Co.	232,050
L. Littlejohn & Co.	144,000
Robinson & Co.	28,800 607,530
DECEMBER 12. By the <i>Tokai Maru</i> , from Singapore, via Yokohama:	
Rubber Trading Co.	142,100
Curry, McPhillips & Co.	52,020

¹Footnote—The figures under this head and under Crude Rubber Arrivals at Pacific Coast as Reported, have been obtained from different sources; repetitions may, therefore, occur.

²Arrived at Vancouver.

ARRIVALS AT THE PORT OF NEW YORK.

PLANTATIONS.

	POUNDS.
L. Littlejohn & Co.	20,160
Meyer & Brown.....	90,720
Alden's Successors, Ltd.	10,080
Robinson & Co.	2,160 317,240
DECEMBER 13. By the <i>Huahuu</i> , from Singapore, via Kobe:	
Charles T. Wilson & Co.	576,900
United States Rubber Co.	350,640 927,540
DECEMBER 16. By the <i>Atsuta Maru</i> , from Singapore, via Yokohama:	
International Trading Co.	97,100

TO SEATTLE, WASH.

NOVEMBER 21. By the <i>East Wind</i> , from Kobe:	
Stern & Co.	159,220
L. Littlejohn & Co.	571,580
Alden's Successors, Limited.....	115,060
Poel & Kelly.....	51,400
J. T. Johnstone & Co.	174,060
Mitsui & Co.	478,540
Charles T. Wilson & Co.	1,620
Edward Maurer & Co.	51,500
Paterson, Simmons & Co., Limited	40,400
Robinson & Co.	22,320
The Goodyear Tire & Rubber Co.	6,480
William H. Stiles.....	28,800 1,707,480
NOVEMBER 22. By the <i>Katori Maru</i> , from Penang, via Yokohama:	
Robinson & Co.	6,300
DECEMBER 12. By the <i>Tokai Maru</i> , from Singapore, via Yokohama:	
Malaysian Rubber Co.	25,200
Alden's Successors, Limited.....	13,860
The Goodyear Tire & Rubber Co.	650,880
L. Littlejohn & Co.	10,080
Poel & Kelly.....	902,860 1,602,880
DECEMBER 13. By the <i>Huahuu</i> , from Singapore, via Kobe:	
L. Littlejohn & Co.	366,660

TO YOUNGSTOWN, OHIO.

NOVEMBER 12. By the <i>East Wind</i> , from Kobe:	
Republic Rubber Corporation.....	70,920
DECEMBER 12. By the <i>Tokai Maru</i> , from Singapore, via Yokohama:	
Republic Rubber Corporation.....	56,340

TO TORONTO, ONT.

	POUNDS.
NOVEMBER 21. By the <i>Protesilaus</i> , from Hong Kong:	
Gutta Percha and Rubber, Limited.....	48,780
DECEMBER 12. By the <i>Tokai Maru</i> , from Singapore, via Yokohama:	
Canadian Wire & Cable Co., Limited....	9,000

²Transhipped from Colombo.

TO VANCOUVER, B. C.

DECEMBER 12. By the <i>Tokaj Maru</i> , from Singapore, via Yokohama:	
J. T. Johnstone & Co.	618,840
L. Littlejohn & Co.	75,600
Poei & Kelly.	47,520
Grace & Co.	15,480
Canadian Consolidated Rubber Co., Limited	149,400
Miner Rubber Co., Limited.	41,760
Various	78,480 1,027,080

SAN FRANCISCO.
PLANTATIONS.

DECEMBER 3. By the <i>Korea Maru</i> , from Yokohama:	
Robinson & Co.	15,480
F. R. Henderson & Co.	102,420
Stiles & Co.	2,160 120,060
DECEMBER 13. By the <i>Siberia Maru</i> , from Singapore:	
United States Rubber Co.	1,029,060
DECEMBER 20. By the <i>Rindjani</i> , from Batavia:	
Stein, Hall & Co.	11,200

RUBBER IMPORTS AND EXPORTS
AT BOSTON.

PORT OF THE DISTRICT OF MASSACHUSETTS.—OCTOBER, 1918.

IMPORTS:	POUNDS.	VALUE.
Crude rubber:		
From—		
China	547,790	174,780
Straits Settlements	246,557	87,134
Dutch East Indies	1,007,634	391,117
Totals	1,801,985	\$653,031
EXPORTS:		
Automobile tires:		
To—		
Newfoundland		\$98
Belted:		
To—		
Newfoundland		\$535
Rubber boots:		
To—		
France	3,416	\$13,235
England	2,748	7,135
Newfoundland	1,404	3,347
Totals	7,568	\$23,717
Rubber shoes:		
To—		
Miquelon Island	82	\$59
Newfoundland	20,100	18,824
Totals	20,182	18,883

IMPORTS:	POUNDS.	VALUE.
Druggists' sundries:		
To—		
Newfoundland		\$147
Cuba		538
Total		\$685
Other rubber manufactures:		
To—		
Canada		\$19
Newfoundland		405
Cuba		17
Total		\$441

RUBBER IMPORTS AND EXPORTS
AT NEW YORK.

IMPORTS. October, 1918.

UNMANUFACTURED—free:	POUNDS.	VALUE.
Crude rubber:		
From—		
England	5,606	\$1,732
Canada	120	70
Honduras	4,000	1,812
Nicaragua	1,200	600
Panama	400	101
Salvador	11,055	5,132
Brazil	2,253,060	813,208
Colombia	60,540	21,755
Ecuador	2,002	1,201
British Guiana	2,843	2,274
Peru	9,520	2,285
Straits Settlements	1,496,600	602,888
British East Indies	262,295	117,800
Dutch East Indies	262,531	115,504
Philippine Islands	8,240	3,215
British West Africa	16,396	3,325
Totals	4,396,407	\$1,692,902
Jelutong (Pontianak):		
From—		
Straits Settlements	21,272	\$1,906
Balata:		
From—		
Panama	19,060	\$6,773
Trinidad	13,440	8,333
Colombia	53,545	21,534
Dutch Guiana	13,671	9,740
Totals	99,718	\$46,389
Reclaimed rubber:		
From—		
England	463,022	\$27,230
Panama	2,765	237
Newfoundland	5,000	300
Totals	470,787	\$27,767
Totals, unmanufactured	4,988,184	\$768,955

EXPORTS OF DOMESTIC MERCHANDISE.

October, 1918.

MANUFACTURED—	POUNDS.	VALUE.
Automobile tires:		
To—		
England		\$535
Costa Rica		70
Guatemala		2,877
Honduras		829
Panama		3,087
Salvador		3,209
Mexico		13,001
Newfoundland		10
Barbados		1,434
Jamaica		3,624
Trinidad		5,291
British West Indies		2,734
Cuba		93,781
Danish West Indies		1,122
Dutch West Indies		2,802
French West Indies		422
Haiti		3,152
San Domingo		6,555
Argentina		8,370
Brazil		32,419
Chile		54,752
Colombia		2,762
Ecuador		5,260
British Guiana		1,643
Peru		24,021
Venezuela		11,347
China		4,089
British East Indies		340
Dutch East Indies		11,689
Russia in Asia		8,806
Turkey in Asia		1,067
Australia		1,076
British West Africa		23
British South Africa		266,770
Portuguese Africa		2,606
Totals		\$581,587
All other tires		\$13,538
Belted		259,378
Rubber boots	87,453	372,830
Rubber shoes	133,184	111,926
Druggists' sundries		22,161
Other rubber manufactures		290,724
Totals		\$1,070,557

EXPORTS OF FOREIGN MERCHANDISE.

October, 1918.

UNMANUFACTURED—	POUNDS.	VALUE.
Balata	112,100	\$62,000
Total exports		\$1,714,144

RUBBER STATISTICS FOR THE DOMINION OF
CANADA.

The import and export figures by countries usually published in this table are withheld by the Canadian Government.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	August.			
	1917.		1918.	
	Pounds.	Value.	Pounds.	Value.
UNMANUFACTURED—free:				
Rubber and gutta percha, crude caoutchouc or india rubber...	948,170	\$557,841	1,722,742	\$714,229
Rubber recovered	398,434	64,138	189,417	32,282
Hard rubber, in sheets and rods.	2,915	2,322	3,919	2,927
Rubber substitute	19,989	2,947	76,102	8,154
Rubber, powdered, and rubber or gutta percha waste	257,360	16,043	131,937	13,029
Rubber thread, not covered....	590	882	1,983	2,906
Totals	1,627,458	\$644,174	2,126,100	\$773,527
Chicle	153,379	52,281	4,584	2,948
MANUFACTURED—dutiable:				
Boots and shoes		\$28,937		\$13,126
Belted		7,516		20,235
Waterproof clothing		36,087		5,395
Hose, lined with rubber		11,135		9,059
Mats and matting		1,449		96
Packing		7,936		13,904
Tires of rubber for all vehicles..		244,331		68,016
Rubber cement and all manufactures of india rubber and gutta percha—n. o. p.		106,254		93,581
Hard rubber, unfinished, in tubes for fountain pens.		1,679		909
Webbing, over one inch wide....		16,727		24,806
Totals		\$462,051		\$249,127

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

August.

	1917.		1918.	
	Produce of Canada. Value.	Reexports of Foreign Goods. Value.	Produce of Canada. Value.	Reexports of Foreign Goods. Value.
MANUFACTURED—				
Belted	\$497		\$1,508	
Hose	9,913		14,587	
Boots and shoes	25,065		416,740	
Tires	59,657	\$2,195	310,611	\$426
Waste	8,595		1,903	
All other—n. o. p.	2,383	459,976	16,511	983
Totals	\$106,110	\$462,171	\$761,860	\$1,409
Chicle	79,215			

MONTHLY IMPORTATIONS OF CRUDE RUBBER
INTO THE UNITED STATES.

	PLANTATIONS.	PARAS.	CANS.	TRALS.	GUAY.	MATTO.	TOTALS	TOTALS
1918.							1918.	1917.
January	15,201	710	...	140	33	...	16,084	12,788
February	9,715	3,108	68	79	120	18	13,108	10,162
March	14,999	1,699	52	122	287	2	17,161	18,624
April	12,703	481	58	37	129	17	13,425	13,000
May	13,783	2,019	174	189	123	...	16,288	18,411
June	21,787	2,146	10	12	60	109	24,124	15,096
July	13,657	2,260	28	88	59	...	16,092	13,418
August	8,473	1,744	61	32	111	...	10,421	17,290
September	4,613	311	124	29	74	...	5,151	13,664
October	7,299	1,958	150	9	93	...	9,509	8,970
November	12,479	861	57	3	211	...	3,363	13,611

(From figures compiled by The Rubber Association of America, Inc.)

EXPORTS OF INDIA RUBBER MANUFACTURES FROM THE UNITED STATES DURING THE MONTH OF OCTOBER, 1918. (BY COUNTRIES).

EXPORTED TO—	Belting, Hose and Packing.		Boots.		Shoes.		Druggists' Rubber Sundries.		Automobile.		Tires. All Other.		All Other Manufactures of India Rubber.		Total Value.
	Pounds.	Value.	Pairs.	Value.	Pairs.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
EUROPE:															
Denmark															
France			87,033	\$371,475	44,000	\$55,728							2,335	\$4,729	\$4,729
Iceland and Faroe Islands....	800	\$80											88,089	111,896	\$39,099
Italy							1,242	\$525					397	523	603
Norway													12,390	13,599	14,124
Portugal									350	\$537			529	765	1,065
Spain							219	1,153							537
England	2,448	1,719	2,748	7,135					434	535			250	256	1,409
Totals, Europe	3,248	\$1,799	89,781	\$378,610	44,000	\$55,728	1,461	\$1,678	784	\$1,072	1,422	\$300	157,999	\$197,235	\$636,422
NORTH AMERICA:															
Bermuda					154	\$108	49	\$101					423	\$277	\$486
British Honduras					1,752	1,173	100	89	24	\$54					1,316
Canada	46,128	\$34,373	1,267	\$4,714	9,560	12,293	27,683	24,001	24,040	27,619	3,194	\$1,813	200,823	147,801	252,614
Costa Rica	1,886	798							60	70	120	140	110	159	1,167
Guatemala	5,210	3,375					264	343	1,749	2,877	793	184	1,981	1,898	8,677
Honduras	1,380	849	42	98	811	574	86	117	1,493	949			178	228	2,915
Nicaragua	1,362	791			1,524	1,496	111	103	258	348			1,135	1,846	4,584
Panama	482	538	12	61	468	509	393	309	3,620	3,395	2,991	1,346	2,240	1,735	7,893
Salvador	1,856	947							2,726	3,409			1,560	1,371	5,727
Mexico	95,931	\$3,400	50	312	1,981	2,230	1,367	1,817	43,970	55,419	4,992	3,707	64,936	12,567	129,452
Miquelon, Langley, etc.					82	59							90	78	137
Newfoundland and Labrador..	2,683	1,825	3,156	9,078	20,100	18,824	186	207	789	874			2,449	2,583	33,391
West Indies—															
British:					81	\$85	14	\$26	1,284	\$1,434			95	\$30	\$1,575
Barbados	4,041	\$1,509			528	805	59	76	2,802	3,696			782	411	6,497
Trinidad and Tobago	1,792	1,169			1,296	523	1,636	2,132	5,209	5,291	80	\$243	2,647	1,420	10,778
Other British West Indies.	726	602			282	268	2	3	3,736	3,400	141	135	689	249	4,657
Cuba	72,959	39,596			8,233	4,925	3,486	5,633	139,236	104,443	4,512	2,500	24,558	18,568	175,665
Danish West Indies.....	7	14					10	12	707	1,122	72	26	1,112	639	1,813
Dutch West Indies.....	88	23					122	113	1,803	2,802			73	24	2,962
French West Indies.....	185	278			1	1		3	784	422			9	11	715
Haiti	160	117					10	3	2,070	3,152			768	699	4,143
Dominican Republic	1,738	1,311					45	61	5,636	6,699	1,174	474	422	473	9,018
Totals, North America..	138,614	\$141,515	4,527	\$14,263	46,853	\$43,973	35,625	\$35,149	241,996	\$227,475	18,877	\$10,740	307,080	\$193,067	\$666,182
SOUTH AMERICA:															
Argentina	929	\$513					135	\$337	6,802	\$8,370			3,828	\$4,379	\$13,599
Bolivia	75	350					2	23					16	47	420
Brazil	9,565	5,502			3,474	\$2,859	973	2,816	31,224	32,419			2,932	5,323	48,919
Chile	24,358	18,541	98	\$553			2,261	2,667	43,635	55,198	5,274	6,182	13,309	9,331	92,472
Colombia	4,135	2,865			373	304			5,830	5,428			1,726	1,537	10,544
Ecuador	369	299					49	73	2,388	2,878			141	77	3,327
British Guiana	490	539	18	57	3,300	1,361	40	36	800	1,643			1,895	1,244	4,880
Dutch Guiana	23	35					249	190			30	86	1,230	935	1,246
Peru	7,708	3,591			312	489	305	308	17,524	24,423			3,374	2,694	31,505
Uruguay							9	3					1,462	1,207	1,210
Venezuela	797	710					358	496	8,868	11,347	25	114	1,056	1,407	14,074
Totals, South America..	48,429	\$32,945	116	\$610	7,459	\$5,013	4,381	\$6,949	117,071	\$141,706	6,276	\$6,792	30,969	\$28,181	\$222,196
ASIA:															
China	14,552	\$9,076			123	\$106	679	\$1,286	9,704	\$11,613	418	\$831	5,227	\$6,263	\$29,175
Chosen	390	157			54	62			1,471	1,388			256	230	1,837
British India	20,267	6,283			144	221	2,434	1,522	3,466	4,144	662	576	4,094	5,529	18,275
Straits Settlements			12	\$36	256	278			5,704	10,582			2,655	1,742	12,638
Other British East Indies.....			28	35					976	2,340			500	1,500	3,875
Dutch East Indies.....	2,627	3,521			3	6	474	557	34,919	38,592	1,616	1,158	8,828	11,547	55,381
French East Indies.....	2,458	1,964									22	22			1,986
Hongkong	322	69	12	36	65	84	10	28	200	90			104	113	420
Japan	110,198	46,128	516	450	17,214	16,584	174	386	14,698	16,189	1,250	1,600	6,309	5,781	87,118
Russia in Asia			2	19	12	35			6,484	8,806	500	1,439	126	32	10,331
Siam									15	12					12
Turkey in Asia									1,355	1,067			248	139	1,206
Totals, Asia	150,814	\$67,198	570	\$576	17,781	\$17,376	3,771	\$3,779	78,992	\$94,823	4,468	\$5,626	28,347	\$32,876	\$222,254
OCEANIA:															
Australia	10,935	\$6,547	192	\$499	5,307	\$3,988	1,667	\$1,958	21,130	\$29,047			3,310	\$3,425	\$45,464
New Zealand	1,771	828	9	35					39,014	38,835			1,858	2,167	41,865
Other British Oceania.....							2	1	200	240					241
French Oceania	318	198					13	23	2,046	2,615	312	\$242	555	557	3,635
German Oceania	20	10							1,056	1,552			295	357	1,919
Philippine Islands	9,069	6,075	12	49	59,420	46,754	626	999	84,044	123,438	6,617	3,013	15,128	23,125	203,453
Totals, Oceania	22,113	\$13,658	213	\$583	64,727	\$50,742	2,308	\$2,981	147,490	\$195,727	6,929	\$3,255	21,146	\$29,631	\$296,577
AFRICA:															
British West Africa.....									25	\$25					\$25
British South Africa.....	271,626	\$124,652	1,956	\$8,188	73,193	\$45,719	1,751	\$1,956	207,391	\$266,770	3,399	\$2,948	30,520	\$14,913	\$465,146
British East Africa.....					324	251									251
French Africa													1,018	879	879
Portuguese Africa	99,044	22,456							1,120	2,606					25,062
Totals, Africa	370,670	\$147,108	1,956	\$8,188	73,517	\$45,970	1,751	\$1,956	208,536	\$269,401	3,399	\$2,948	31,538	\$15,792	\$491,363
Total	833,888	\$404,223	97,163	\$402,830	254,427	\$218,802	49,297	\$52,492	794,869	\$930,204	41,371	\$29,661	577,079	\$496,782	\$2,534,994

(Compiled by the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C.)

RUBBER STATISTICS FOR ITALY. IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

Four Months Ended April 30.

OBER,

Total
Value.
\$4,729
539,099
603
14,124
1,065
537
1,409
74,856
\$636,422

\$486
1,316
252,614
1,167
8,677
2,915
4,584
7,893
5,727
129,452
137
33,391
\$1,575
6,497
10,778
4,657
175,665
1,813
2,962
715
4,143
9,018
\$666,182
\$13,599
420
48,919
92,472
10,544
3,327
4,880
1,246
31,505
1,210
14,074
\$222,196
\$29,175
1,837
18,275
12,638
3,875
55,381
1,986
420
87,118
10,331
12
1,206
\$222,254
\$45,464
41,865
241
3,635
1,919
203,453
296,577

\$486
1,316
252,614
1,167
8,677
2,915
4,584
7,893
5,727
129,452
137
33,391
\$1,575
6,497
10,778
4,657
175,665
1,813
2,962
715
4,143
9,018
\$666,182
\$13,599
420
48,919
92,472
10,544
3,327
4,880
1,246
31,505
1,210
14,074
\$222,196
\$29,175
1,837
18,275
12,638
3,875
55,381
1,986
420
87,118
10,331
12
1,206
\$222,254
\$45,464
41,865
241
3,635
1,919
203,453
296,577

	1917.		1918.	
	Quintals. ¹	Lire. ²	Quintals.	Lire.
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
From—				
Great Britain	2,944	.....	3,363	.....
India and Ceylon	3,702	.....	1,263	.....
Straits Settlements	144	.....	8,860	.....
French Africa	632	.....	1,743	.....
Belgian Congo	9,355	.....	61	.....
Brazil	154	.....	1,870	.....
Other countries .....	.....	.....	1,141	.....
Totals	17,115	15,403,500	18,301	16,470,900
Rubber scrap	1,457	145,700	168	16,800
MANUFACTURED—				
India rubber and gutta percha—threads:				
From—				
Great Britain	52	.....	34	.....
United States	32	.....	56	.....
Other countries	5	.....	.....	.....
Totals	89	178,000	90	180,000
India rubber and gutta percha—sheets:				
Cut sheets	2	3,500	.....	.....
Other kinds, including hand rubber	36	31,320	13	11,310
India rubber and gutta percha—tubes:				
From cut sheets	1	1,850	.....	.....
Elastic fabric	31	21,700	68	47,600
Other forms	6	4,800	.....	.....
Belting	167	4,800	255	204,000
Rubber-coated fabrics—pieces:				
For carding combs	147	150,675	78	79,950
Other forms:				
From—				
Great Britain	24	.....	3	.....
Other countries	11	.....	.....	.....
Totals	35	45,500	3	3,900
Boots and shoes—pairs:				
From—				
France	5,709	.....	12,356	.....
United States	8,334	.....	193	.....
Other countries	97	.....	284	.....
Totals	14,140	91,910	12,833	83,415
Elastic webbing:				
From—				
France	68	.....	45	.....
Great Britain	24	.....	4	.....
Other countries	11	.....	10	.....
Totals	103	175,100	59	100,300
Clothing and articles for travel.	4	9,600	.....	.....
Manufactures of india rubber and gutta percha—n. e. s:				
From cut sheets	31	68,200	4	8,800
Elastic fabric:				
From—				
France	18	.....	2	.....
Great Britain	191	.....	305	.....
Other countries	29	.....	5	.....
Totals	238	226,100	312	296,400
Tires and tubes:				
From—				
France	780	.....	985	.....
Great Britain	721	.....	244	.....
Other countries	66	.....	.....	.....
Totals	1,567	2,444,520	1,229	1,917,240
MANUFACTURED—				
Other rubber manufactures:				
From—				
France	228	.....	1,174	.....
Great Britain	485	.....	425	.....
United States	173	.....	111	.....
Other countries	4	.....	1	.....
Totals	890	712,000	1,711	1,368,800
Total imports		19,847,575		20,789,415

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

Four Months Ended April 30.

	1917.		1918.	
	Quintals.	Lire.	Quintals.	Lire.
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
To—				
Spain	330	.....	585	.....
United States	1,470	.....	115	.....
Totals	1,800	\$40,000	700	210,000

Four Months Ended April 30.

	1917.		1918.	
	Quintals.	Lire.	Quintals.	Lire.
MANUFACTURED—				
India rubber and gutta percha—threads:				
To—				
France	32	.....	18	.....
Great Britain	28	.....	.....	.....
Spain	27	.....	.....	.....
Switzerland	16	.....	.....	.....
Argentina	16	.....	.....	.....
Other countries	4	.....	.....	.....
Totals	123	233,700	18	34,200
India rubber and gutta percha—sheets:				
Cut sheets	4	6,800	6	10,200
Elastic fabrics	13	7,800	20	12,000
Insulated wire	1	350	.....	.....
Other forms, comprising hard rubber	40	34,000	20	17,000
India rubber and gutta percha—tubes:				
From cut sheets .....	.....	.....	3	5,700
Elastic fabric	78	50,700	86	55,900
Other forms	122	91,500	64	48,000
Belting	8	5,760	35	25,200
Rubbered fabrics—pieces	97	97,000	38	38,000
Elastic webbing:				
To—				
France	6	.....	2	.....
Greece	18	.....	74	.....
Spain	29	.....	8	.....
Switzerland	113	.....	9	.....
Egypt	28	.....	20	.....
Argentina	122	.....	43	.....
Brazil	236	.....	70	.....
Chile	29	.....	15	.....
Cuba	31	.....	2	.....
Other countries	48	.....	24	.....
Totals	660	1,056,000	262	419,200
Clothing and articles for travel.	25	57,500	3	6,900
Manufactures of rubber and gutta percha—n. e. s:				
From cut sheets:				
To—				
Great Britain	3	.....	.....	.....
Argentina	18	.....	39	.....
Uruguay	8	.....	2	.....
Other countries	1	.....	4	.....
Totals	30	60,000	45	90,000
Elastic fabric	54	48,600	57	51,300
Tires and tubes:				
To—				
France	398	.....	190	.....
Great Britain	11,209	.....	971	.....
Spain	1	.....	81	.....
Switzerland	300	.....	.....	.....
India and Ceylon	494	.....	.....	.....
Dutch East Indies	159	.....	441	.....
Straits Settlements	222	.....	.....	.....
Australia	199	.....	.....	.....
Argentina	1,592	.....	4	.....
Brazil	716	.....	434	.....
Other countries	228	.....	244	.....
Totals	15,518	9,635,850	2,365	2,447,775
Other manufactures:				
To—				
France	101	.....	70	.....
Great Britain	94	.....	86	.....
Spain	11	.....	7	.....
Switzerland	50	.....	109	.....
Egypt	5	.....	21	.....
Argentina	205	.....	31	.....
Brazil	82	.....	17	.....
Uruguay	35	.....	8	.....
Other countries	69	.....	55	.....
Totals	652	586,800	404	363,600
Total exports		12,512,360		3,834,975

¹A quintal = 220.46 pounds.²A lira = \$0.193.

UNITED KINGDOM RUBBER STATISTICS.

The import and export figures by countries usually published in this table are withheld by the British Government.

IMPORTS.

	1917.		1918.	
	Pounds.	£	Pounds.	£
UNMANUFACTURED—				
Crude rubber	9,590,200	1,200,170	4,282,200	482,581
Waste and reclaimed rubber	156,800	4,552	3,600	32
Gutta Percha	561,600	64,561	997,600	186,189
Totals	10,308,600	1,269,283	5,283,400	668,802

October.

MANUFACTURED—	October			
	1917.		1918.	
	Pounds.	£	Pounds.	£
Boots and shoes....dozen pairs	7,188	12,236	1,480	6,690
Waterproof clothing		215		
Automobile tires and tubes....		89,322		70,539
Motorcycle tires and tubes....		2,527		16
Bicycle tires and tubes....		365		
Insulated wire		1,538		1,538
Totals	7,188	106,203	1,480	78,774

EXPORTS.				
UNMANUFACTURED—				
Waste and reclaimed rubber...	1,180,400	24,603	249,200	6,917
MANUFACTURED—				
Waterproof clothing		56,747		36,968
Boots and shoes....dozen pairs	9,384	10,536	5,945	9,218
Insulated wire		9,066		5,473
Submarine cables		42,437		2,146
Carriage tires and tubes....		11,537		15,228
Automobile tires and tubes....		120,045		137,525
Motorcycle tires and tubes....		4,751		10,241
Bicycle tires and tubes....		26,688		22,522
Other manufactures of india rubber		141,380		117,723
Totals	9,384	419,187	5,945	357,044

EXPORTS—FOREIGN AND COLONIAL.

UNMANUFACTURED—	October.			
	1917.		1918.	
	Pounds.	£	Pounds.	£
Crude rubber	8,286,000	1,055,030	2,521,700	289,847
Waste and reclaimed rubber...	22,200		676	
Gutta percha	41,400	5,033	2,100	428
Totals	8,349,600	1,060,063	2,524,476	290,275

LONDON AND LIVERPOOL RUBBER STATISTICS.

The import and export figures by countries usually published in this table are withheld by the British Government.

IMPORTS.				
October.				
UNMANUFACTURED:	1917.		1918.	
	Pounds.	£.	Pounds.	£.
Crude rubber:				
At—				
London	4,187,400	526,621	1,690,100	193,326
Liverpool	4,885,500	602,306	2,253,600	255,704
Totals	9,072,900	1,128,927	3,943,700	449,020
Waste and reclaimed rubber:				
At—				
London	25,700	669	3,600	32
Liverpool	112,200	3,501		
Totals	137,900	4,170	3,600	32

EXPORTS.

Waste and reclaimed rubber:

From—

London

Liverpool

Totals

Crude rubber:

From—

London

Liverpool

Totals

THE MARKET FOR RUBBER SCRAP.

NEW YORK.

THE upward tendency has not developed further strength, but there has been very little sagging during the month, and as so many commodities have moved downward during the last few weeks, scrap dealers may have cause for thankfulness, if not for jubilation. There is great satisfaction over the fact that the Government no longer places any restrictions on the use of rubber by manufacturers. While, of course, crude-rubber men also have reason to be glad for that, the value of reclaimed rubber is so well established that scrap dealers expect both better prices and more business within the next few weeks.

BOOTS AND SHOES.—A very quiet market at 8½ cents to 9 cents, delivered mill.

INNER TUBES.—Scarcely any movement at all, but quotations on all grades one-quarter or one-half cent higher.

MECHANICALS.—Transactions purely nominal.

TIRES.—Sales small and hard to make, prices unchanged.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED. DECEMBER 26, 1918.

Prices subject to change without notice.

BOOTS AND SHOES.			
Arctic tops	lb.	*\$0.01½ @	
Boots and shoes	lb.	.08½ @	.09
Trimmed arctic	lb.	.07½ @	
Untrimmed arctic	lb.	.06½ @	
HARD RUBBER.			
Battery jars, black compound.....	lb.	*.02 @	
No. 1, bright fracture.....	lb.	.25 @	.26
INNER TUBES.			
No. 1, old packing.....	lb.	.22½ @	.23
No. 1, new packing	lb.	.24½ @	
No. 2	lb.	.11½ @	.12
Red	lb.	.11½ @	
MECHANICALS.			
Black scrap, mixed, No. 1.....	lb.	.043½ @	
No. 2.....	lb.	.033½ @	
Car springs	lb.	.04½ @	
Heels	lb.	.04 @	
Horse-shoe pads	lb.	.04½ @	
Hose, air-brake	lb.	*.05½ @	
fire, cotton lined.....	lb.	*.02½ @	
garden	lb.	*.02½ @	
Insulated wire stripping, free from fiber.....	lb.	.01½ @	
Matting	lb.	.01½ @	
Packing	lb.	.01½ @	
Red scrap, No. 1.....	lb.	.09½ @	.10
No. 2.....	lb.	.07½ @	
White scrap, No. 1.....	lb.	.12½ @	
No. 2.....	lb.	*.09 @	
TIRES.			
PNEUMATIC:			
Auto peelings, No. 1.....	lb.	*.11½ @	.12
No. 2.....	lb.	.06½ @	.06½
Bicycle	lb.	.04½ @	
Standard white auto.....	lb.	.05½ @	
Standard mixed auto.....	lb.	.05 @	
Stripped, unguaranteed	lb.	.03½ @	
White, G. & G. M. & W. and U. S.	lb.	*.05½ @	.05½
SOLID:			
Carriage	lb.	.04½ @	
Irony	lb.	.01½ @	.02
Truck	lb.	.05 @	.05½

*Nominal

THE MARKET FOR COTTON AND OTHER FABRICS. NEW YORK.

THE total production of cotton in the United States for 1918-1919 is now estimated by the Department of Agriculture at 5,595,529,000 pounds—linters not included—equivalent to 11,700,000 bales. In 1917, 11,302,375 bales had been produced, and in 1916, 11,449,930 bales. This year's production thus exceeds last year's by 398,000 bales. The maximum prices and restrictions on cotton fabrics and manufacture enforced by the price-fixing committee of the War Industries Board end January 1, 1919, when the Board itself goes out of existence. No part of the stocks of cotton goods purchased by the Government will be sold in the open market, which would disturb the cotton goods market. The greater part of the stocks will be used for European relief, and some will be sold back to the manufacturers.

Since December 20, 1918, the following commodities are no longer on the export conservation list: Egyptian cotton, airplane cotton duck, cotton lintens, rubberized silk suitable for use in the manufacture of aircraft and silk schappe.

EGYPTIAN COTTON.—The War Trade Board announces that the regulations on the importation of Egyptian cotton issued in W. T. B. R. 144, June 30, 1918, are revoked. Beginning January 1, 1919, licenses will be granted to import not to exceed 40,000 bales of Egyptian cotton, quality or grade unlimited. The War Trade Board will control the distribution in this country of the quantities imported through the Textile Alliance, Inc.

SEA ISLAND COTTON.—Net receipts at Savannah this season are 4,775 bales, against 19,859 last year. Interior points report an increase of business with prices a cent or two higher. Gin-

ning will be over by January 1. Quotations are omitted owing to the irregularity of asking prices.

DUCKS, DRILLS AND OSNABURGS.—The price of hose and belting duck remains firm, owing to the strength of the raw cotton market and the demand for duck, which is particularly active among the automobile trade. Quotations for the other fabrics have moved up and down, and are fairly described to-day as "same as last." Market stronger. Demand improving.

RAINCOAT FABRICS.—No business at all being done at the present time, but activity expected for the new year. Prices have been declining.

TIRE FABRICS.—Demand is slow, nothing unusual for the holiday season, but indications are for increasing activity.

NEW YORK QUOTATIONS.

DECEMBER 26, 1918.

Prices subject to change without notice.

AIRPLANE AND BALLOON FABRICS:

Wamsutta, S. A. I. L. No. 1, 40-inch.....yard None
No. 4, 38½-inch.....\$0.47½@

ASBESTOS CLOTH:

Brake lining, 2½ lbs. sq. yd., brass or copper insertion.....lb. .85 @
2½ lbs. sq. yd., brass or copper insertion.....lb. .90 @

BURLAPS:

32— 7-ounce100 yards 10.25 @
32— 8-ounce10.50 @
40— 7½-ounce11.33 @
40— 8-ounce11.50 @
40—10-ounce16.20 @
40—10½-ounce16.50 @
45— 7½-ounceNone
45— 8-ounceNone
45— 9½-ounce18.25 @
48—10-ounce21.80 @

DRILLS:

38-inch 2.00-yardyard .30½ @
40-inch 2.47-yard25½ @
52-inch 1.90-yard32½ @
52-inch 1.95-yard31¾ @
60-inch 1.52-yard40 @

DUCK:

CARRIAGE CLOTH:

38-inch 2.00-yard enameling duck.....yard .31 @
38-inch 1.74-yard35½ @
72-inch 16.66-ounce66½ @
72-inch 17-21ounce68½ @

MECHANICAL:

Hosepound .62½
40-inch, 10-ounce64½
Belting62½

HOLLANDS, 40-INCH:

Acmeyard .30 @
Enduranceyard .33 @
Pennyard .34 @

OSNABURGS

40-inch 2.35-yardyard .25½ @
40-inch 2.48-yard25½ @
37½-inch 2.42-yard25½ @

RAINCOAT FABRICS:

COTTON:

Bombazine 64 x 60 water-repellent.....yard .17 @
60 x 48 not water-repellent......15 @
Cashmere, cotton and wool, 36-inch, tan......80 @
blue and black......85 @
Twills 64 x 72......30 @ .32½
64 x 102......35 @ .37½
Twill, mercerized, 36-inch, tan and olive......32½ @
blue and black......33½ @
Tweed45 @ 1.00
Tweed, printed18½ @ .25
Plaids 60 x 48......16½ @
56 x 44......15 @
Repp37½ @ .45
Surface prints 60 x 48......16½ @
64 x 60......18 @

IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING

—PLAIN AND FANCIES:

63-inch, 3¼ to 7½ ounces.....yard 1.15 @ 3.25
36-inch, 2¼ to 5 ounces......80 @ 1.85

IMPORTED PLAID LINING (UNION AND COTTON):

63-inch, 2 to 4 ounces.....yard .90 @ 1.70
36-inch, 2 to 4 ounces......52½ @ 1.05

DOMESTIC WORSTED FABRICS:

36-inch, 4¼ to 8 ounces.....yard .75 @ 2.00

DOMESTIC WOVEN PLAID LININGS (COTTON):

36-inch, 3¼ to 5 ounces.....yard .27½ @ .50

SHEETINGS:

JACKET:

Delawareyard .30 @
Schuylkillyard .32 @

SILKS:

Canton, 38-inchyard .37½ @
Plain40 @
Schappe, 36-inch55 @

STOCKINETTES:

COTTON, 52-INCH:

D—14-ounceyard *.85 @ .90
E—11½-ounce*.60 @ .65
F—14-ounce*.85 @ .90
G— 8-ounce*.75 @ .80
H—11-ounce*.70 @ .85
I— 9-ounce*.60 @ .65
Knitabackpound *.175 @ 2.00

WOOL, 52-INCH:

A—14-ounceyard *.175 @
B—14-ounce*.225 @
C—14-ounce*.250 @

TIRE FABRICS:

17¼-ounce Sea Island, combed.....square yard 1.62 @
17¼-ounce Egyptian, combed.....1.30 @
17¼-ounce Egyptian, carded.....1.27 @
17¼-ounce Peelers, combed.....1.15 @
17¼-ounce Peelers, carded......97 @

*Nominal.

TIRE FABRICS

JENCKES SPINNING COMPANY

PAWTUCKET
RHODE ISLAND

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1, 1918, TO OCTOBER 9, 1918.

To—	1918-19.	1917-18.	1916-17.
Liverpool	46,701	34,166	28,299
Manchester	19,286	10,249	7,972
Other United Kingdom ports.....	5,537		
Total shipments to Great Britain....	71,524	44,415	36,271
To—			
France	502		
Spain	10,140		
Italy	14,444		
Switzerland		8,118	4,938
Norway			
Sweden			445
Russia	3,213		50
Greece			
Total shipments to Continent.....	28,299	11,405	8,907
To—			
United States of America.....			2,233
India	3,952	7,714	310
Japan	3,952		
Total shipments to all parts.....	103,775	63,534	47,721
Total crop (interior gross weight), cantars ¹	6,315,841	5,126,199	

¹Cantar equals 98 pounds.

(Compiled by Davies, Benachi & Co.)

SEA ISLAND COTTON CROP MOVEMENT.

FROM AUGUST 1, 1918, TO NOVEMBER 29, 1918.

	Receipts.	1918-19.	1917-18.
Stock on hand, August 1, 1918—			
Savannah, 15,247; Charleston, 517.....bales		15,764	1,044
Received at Savannah (gross).....		3,194	14,922
Received at Charleston.....		3,007	3,225
Received at Jacksonville.....		3,032	15,297
Received at Brunswick.....			
Received at Norfolk.....			
Totals		24,997	34,488
Less exports		12,850	22,570
Stock November 29, 1918—			
Savannah, 9,408; Charleston, 2,769.....bales		12,177	11,918
Crop in sight at all ports to date.....		9,233	33,394

EXPORTS.

From—	To	Great Britain.	North Mills.	South Mills.	Totals.
					1918-19.
Savannah		144	8,199	690	9,033
Charleston			785		785
Jacksonville			3,032		3,032
Brunswick					
Norfolk					
Totals, 1918-19		144	12,016	690	12,850
Totals, 1917-18			21,683	887	22,570
		144	9,667	197	9,720

¹Increase.²Decrease.

(Compiled by John Malloch & Co., Savannah, Georgia.)

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK.

THE base metal market is dead. Present conditions are so hard to analyze that neither producers nor consumers care to do anything but await the outcome of the course of events. It is understood that, after January 1, government control of all commodities save tin will come to an end. There are no inquiries for copper. Tin, contrary to expectation, is no longer subject to international control, but will be regulated in the United States until the stocks of the Steel Products Co. have been utilized. Meanwhile there is no demand. There is no interest in lead. Few purchasers of spelter. Antimony is falling.

CARBON TETRACHLORIDE.—Sales of this material have been made at 18 cents a pound by second hands. The undertone is weak.

DRY COLORS.—As soon as production costs can be reduced, it is expected that prices will fall. The market is quiet now, but producers are beginning to pay considerable more attention to the export trade than they did in the past. Iron blues have been selling as low as \$1.10. Prices are firm.

LITHARGE.—Little demand for this pigment. American powdered, in casks, sells at from 10¼ cents to 11¼ cents. Quotations vary according to quantities asked for.

LITHOPHONE.—A cut in price of ¼-cent a pound has been announced for the next three months. Quotations now are 7¼ cents for carload lots and 8¼ cents for less than carload lots. More interest is being shown.

SULPHURIC ACID.—Although the producers had asked the government to continue price-fixing for some months, control ceased December 31. But the producers are closing contracts for future delivery at the old W. T. B. prices, \$28 for oleum, \$25 for 66-degree and \$18 for 60-degree.

TALC.—The situation remains unchanged. Shipping is the decisive factor in imports as well as exports.

WHITING.—In spite of the cancellation of government orders the supply is none too great, so prices are not undergoing change.

ZINC OXIDE.—The producers have announced new prices for the next three months which are ¼-cent lower on American process oxide and one cent lower on French process oxide. It is thought imports will soon come in again. Some dealers are beginning to sell at a fraction less than prices quoted.

NEW YORK QUOTATIONS.

DECEMBER 26, 1918.

Prices subject to change without notice.

ACCELERATORS, ORGANIC.

Accelerator N. C. C.....	lb.	.50	@
Accelerator No. 1.....	lb.	.60	@
Accelerator No. 10.....	lb.	.40	@
Accelerene	lb.	\$2.62	@
Accelermal	lb.	.65	@
Aldehyde ammonia crystals.....	lb.	1.00	@
Aniline oil	lb.	.28	@
Annex	lb.	1.25	@
Duplex	lb.	.75	@
Excellerex	lb.	.85	@
Hexamethylenexamine (Vitalin).....	lb.	.65	@
Hexamethylene tetramine (powdered).....	lb.	1.15	@ 1.25
Paraphenylenediamine	lb.	3.50	@
Tensilite	lb.	.60	@
Thiocarbamilide	lb.	.50	@
Velocite	lb.	.50	@
Vitaminex	lb.	.65	@

ACCELERATORS, INORGANIC.

Lead, dry red.....	lb.	.11¼	@
sublimed blue.....	lb.	.09¼	@
sublimed white.....	lb.	.09¼	@
white, basic carbonate.....	lb.	.10¼	@
white, basic sulphate.....	lb.	.09¼	@ .09¼
Lead oleate	lb.	.27	@ .33
Lime, flour	lb.	.02	@ .02¼
Litharge, domestic	lb.	.10¼	@
English	lb.	.15	@ .15¼
sublimed	lb.	.11	@
Magnesium, carbonate	lb.	.14	@ .16
Diatomite	lb.	.02¼	@
calcined heavy (Thistle).....	lb.	.11	@
heavy (States).....	lb.	.07¼	@
light (Manhattan).....	lb.	.35	@
Magnesium oxide	lb.	.06¼	@
Magnesite, calcined, powdered.....	ton	50.00	@ 65.00

ACIDS.

Acetic, 28 per cent (bbis.).....	cwt.	5.16	@
Glacial, 99 per cent (carboys).....	lb.	.20¼	@
Cresylic, 97-99 per cent, straw color.....	gal.	1.12	@
95 per cent, dark.....	gal.	1.02	@
Muriatic, 20 degrees	cwt.	2.05	@ 2.30
Nitric, 36 degrees	cwt.	6.85	@
Sulphuric, 66 degrees	cwt.	2.10	@

ALKALIES.

Caustic soda, 76 per cent (bbis.).....	lb.	.07	@
Soda ash (bbis.).....	lb.	.04¼	@

COLORS.

Black:			
Bone, powdered	lb.	.05	@
granulated	lb.	.09	@
Carbon, black (sacks, factory).....	lb.	.16	@ .25
Drop	lb.	.07	@
Ivory black	lb.	.16	@ .30
Lampblack	lb.	.15¼	@
Oil soluble aniline.....	lb.	.75	@ 1.50
Rubber black	lb.	.07	@
Blue:			
Cobalt	lb.	.25	@ .35
Prussian	lb.	1.25	@
Ultramarine	lb.	.22	@ .50
Brown:			
Iron oxide	lb.	.04	@ .05
Ochre, domestic	lb.	.02¼	@ .04
imported	lb.	.05	@ .06
Sienna, Italian, raw and burnt.....	lb.	.07	@
Umber, Turkey, raw and burnt.....	lb.	.05	@ .06
Green:			
Chrome tile	lb.	.17	@
Oxide of chromium (casks).....	lb.	.80	@
India rubber	lb.	.75	@

Red:

Antimony, crimson, sulphuret of (casks).....lb.	.50	@
crimson, "Mephisto" (casks).....lb.	.60	@
golden, sulphuret of (casks).....lb.	.25	@
golden, "Mephisto" (casks).....lb.	.30	@
golden sulphuret (States).....lb.	.28	@
red sulphuret (States).....lb.	.25	@
vermillion sulphuret.....lb.	.55	@
Arsenic, red sulphide.....lb.	.35	@
Indian, pure bright.....lb.	.16	@
Iron oxide, reduced grades.....lb.	.12	@
pure bright.....lb.	.15	@
Oil soluble aniline, red.....lb.	*2.50	@ 3.00
orange.....lb.	*2.00	@
Oxymony.....lb.	.18	@
Venetian.....lb.	.02 1/2	@ .06
Vermilion, English, pale, medium, dark.....lb.	2.05	@

White:

Aluminum bronze powder.....lb.	.85	@
C. P. (cases).....lb.	1.00	@
superior.....lb.	1.00	@
Lithopone, imported.....lb.	None	@
domestic.....lb.	.07 3/4	@ .08
Ponolith (carloads, factory).....lb.	.07 3/4	@ .08
Rubber makers' white.....lb.	*.08	@ .08 1/2
Zinc oxide, Horsehead (less carload, factory):		
"XX red".....lb.	.10 1/4	@
"Special".....lb.	.10 3/4	@
French process, red seal.....lb.	.12 1/4	@
green seal.....lb.	.12 3/4	@
white seal.....lb.	.13 1/4	@
(States).....lb.	.10 1/4	@
Zinc sulphide, pure.....lb.	None	@

Yellow:

Cadmium, tri-sulphate.....lb.	*2.68	@
sulphide.....lb.	*1.80	@
Chrome, light and medium.....lb.	.31	@
India rubber.....lb.	*1.00	@
Ochre, light or dark.....lb.	.02 3/4	@
Oil soluble aniline.....lb.	*2.00	@
Zinc chromate.....lb.	*.50	@

COMPOUNDING INGREDIENTS.

Aluminum flake (bbls. factory. Less 5% carload).....ton	26.00	@
(sacks factory. Less 5% carloads).....ton	26.00	@
Aluminum oxide.....lb.	*.18	@
Ammonia carbonate, powdered.....lb.	.12 1/4	@ .13
lumps.....lb.	.11 1/4	@ .12
Asbestine (bags).....ton	*25.00	@ 35.00
Asbestos (bags).....ton	25.00	@
Barium carbonate, precipitated.....ton	60.00	@
sulphide, precipitated.....lb.	.07 1/2	@
Barytes, pure white.....ton	30.00	@
off color.....ton	22.50	@
uniform floated.....ton	32.00	@ 34.00
Basofo.....lb.	.05 1/2	@
Blanc fixe.....lb.	.04	@
Bone ash.....lb.	.06	@ .05 1/4
Chalk, precipitated, extra light.....lb.	.05	@ .04 1/2
precipitated, heavy.....lb.	.04	@ .04 1/2
China clay, domestic.....ton	15.00	@ 22.00
imported.....lb.	.02 1/2	@
Cork flour.....lb.	.50	@
Cotton linters, clean mill run, f. o. b. factory.....ton	45.00	@ 50.00
Fossil flour (powdered).....ton	55.00	@ 60.00
(bolted).....lb.	.36	@ .45
medium.....lb.	.31	@ .35
low grade.....lb.	.22	@ .26
Graphite, flake (400 pound bbl.).....lb.	.10	@ .25
amorphous.....lb.	.04	@ .08
Ground glass FF. (bbls).....lb.	.03	@ 3.00
Infusorial earth, powdered.....ton	45.00	@ 50.00
bolted.....ton	55.00	@ 60.00
Mica, powdered.....lb.	.03 1/2	@ .05
Plaster of Paris.....lb.	2.00	@
Plastigum.....lb.	.15	@
Pumice stone, powdered (bbl.).....lb.	.05	@ .08
Rotten stone, powdered.....lb.	.02 1/2	@ .04 1/2
Rubber flux.....lb.	*.15	@
Rubblide.....lb.	*.38	@
Rub-R-Glu.....lb.	.25	@
Silex (silica).....ton	22.00	@ 40.00
Soapstone, powdered, domestic.....ton	25.00	@ 27.00
imported.....ton	None	@
Starch, powdered corn (carload, bbls.).....cwt.	4.24	@
(carload, bags).....cwt.	4.02	@
Talc, American.....ton	20.00	@ 40.00
French.....ton	None	@
Tripoli earth, powdered.....lb.	.01 1/2	@
Tyre-lith.....ton	80.00	@
Walpole rubber flux (factory).....lb.	.06	@
Whiting, Alha (carloads).....cwt.	.90	@ 1.00
commercial.....cwt.	1.30	@
gilders.....cwt.	1.40	@
Paris, white, American.....cwt.	1.75	@
English clifstone.....cwt.	2.00	@
Wood pulp XXX.....ton	*40.00	@ 45.00

MINERAL RUBBER.

Gilsonite.....ton	47.50	@ 57.50
Genasco (carloads factory).....ton	*55.00	@ 57.00
M. R.....ton	*65.00	@
M. R. X.....ton	*100.00	@
Liquid rubber.....lb.	*.14	@ .15
Pioneer, carload, factory.....ton	*50.00	@
less carload, factory.....ton	*55.00	@
Richmond.....ton	75.00	@
No. 64.....ton	45.00	@
Refined Elaterite.....ton	175.00	@
Raven M. R.....ton	50.00	@ 60.00

OILS.

Corn, crude (bbls.).....lb.	*.18	@ .18 1/2
refined.....lb.	*21 1/2	@
Glycerine (98 per cent).....lb.	.35	@
Glycerole.....lb.	.10	@
Linseed, raw (carloads).....gal.	1.60	@
Linseed compound.....gal.	1.00	@
Palm.....lb.	.32	@ .50
Paraffin.....gal.	.40	@ .41
Petrolatum.....lb.	.08	@
Petroleum grease.....lb.	.06 1/2	@
Pine, steam distilled.....gal.	.69	@
Pine tar.....gal.	.36	@
Rapeseed, refined.....lb.	.17	@
blown.....lb.	.22 1/2	@
Rosin.....gal.	.82	@
Soya bean, crude.....lb.	.16 1/2	@
refined.....lb.	.22	@
Tar, commercial (cases).....gal.	.35	@ .36
Noreacol No. 30.....gal.	.65	@

SOLVENTS.

Acetone (98-99 per cent drums).....lb.	.30	@
methyl (bbls.).....gal.	1.25	@
Benzol, C. P. (drums).....gal.	.22	@ .27
90 per cent.....gal.	.22	@ .27
Beta-naphthol, resublimed.....lb.	.95	@
ordinary grade.....lb.	.65	@
Halowax oil No. 1000 (f. o. b. Wyandotte).....lb.	*.30	@
No. 1001 (f. o. b. Wyandotte).....lb.	*.35	@
Naphtha, motor gasoline (steel bbls.).....gal.	.24 1/2	@
73 @ 76 degrees (steel bbls.).....gal.	None	@
68 @ 70 degrees (steel bbls.).....gal.	None	@
Solvent.....gal.	.21	@
V. M. & P. (steel bbls.).....gal.	.23 1/2	@
Toluol, pure.....gal.	.25	@ .30
Turpentine, spirits.....gal.	.70	@ .70 1/2
wood.....gal.	.58	@ .65
Venice.....lb.	.65	@ .66
Osmaco reducer.....gal.	.35	@
Zylol, pure.....gal.	.45	@ .50
commercial.....gal.	.30	@ .35

SUBSTITUTES.

Black.....lb.	.11	@ .18
White.....lb.	.13	@ .25
Brown.....lb.	.18	@ .24
Brown factice.....lb.	.10	@ .22
White factice.....lb.	.15	@ .24
Cordex.....lb.	*.45	@
Energine.....lb.	*.30	@
Paragol soft and medium (carloads).....cwt.	17.08	@
hard.....cwt.	16.58	@
Toughenite.....lb.	*.40	@

VULCANIZING INGREDIENTS.

Carbon, bisulphide (drums).....lb.	.07 1/2	@
tetrachloride (drum).....lb.	.17	@
Lead, black hyposulphite (Black Hypo).....lb.	*.47	@
Orange mineral, domestic.....lb.	.14 1/4	@
Sulphur chloride (drums).....lb.	.08 1/2	@
Sulphur, flour, Brooklyn brand (carloads).....cwt.	3.40	@
pure soft (carloads).....cwt.	3.40	@
superfine (carloads, factory).....cwt.	2.50	@

(See also Colors-Antimony)

RESINS AND PITCHES.

Castella gum.....lb.	.70	@ .75
Pine tar, retort.....bbl.	15.50	@
kilt.....bbl.	15.00	@
Pitch, Burgundy.....lb.	.10	@
coal tar.....lb.	.01 1/2	@
pine tar.....bbl.	.05	@
ponto.....lb.	.14	@
Resin, Pontianak, refined.....lb.	None	@
granulated.....lb.	None	@
fused.....lb.	None	@
Rosin, K.....bbl.	17.30	@
powdered.....lb.	.20	@
Shellac, fine orange.....lb.	.65	@ .70
Tar, kiln.....bbl.	13.00	@ 13.50
retort.....bbl.	14.00	@ 14.50

WAXES.

Wax, beeswax, white.....lb.	.70	@
ceresin, white.....lb.	.20	@ .22
carnauba.....lb.	.60	@ .90
osokerite, black.....lb.	.58	@ .60
green.....lb.	.78	@ .80
montan.....lb.	.45	@
substitute.....lb.	.20	@ .30
paraffin, refined 118/120 m. p. (cases).....lb.	.13	@
124/126 m. p. (cases).....lb.	None	@
128 m. p. (cases).....lb.	.14 1/2	@
130 m. p. (cases).....lb.	None	@

*Nominal.

A CORRECTION.

Mrs. Bertha M. Lufbery has been appointed executrix of the estate of the late George F. Lufbery, Jr., at-Elizabeth, New Jersey. Contrary to the statement which appeared in our issue of December 1, 1918, Mr. Lufbery's rubber substitute business has not been taken over by W. J. Moren.



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